iridium®

Iridium **Pilot**™

User Manual

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Iridium **Pilot**™

User Manual

User Manual also applies to Iridium OpenPort units using firmware version AO12001 or higher.

Version 1

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Section I – INTRODUCTION

1.0 Introduction

Thank you for purchasing the state of the art Iridium Broadband Subscriber Unit. Iridium is the only provider of truly global satellite voice and data communications solutions with complete coverage of the entire earth including polar-regions. The Iridium Pilot delivers reliable, near real-time, simultaneous high-quality voice and data connection to the Iridium satellite network from any point on the globe.

1.1 About this Manual

This is a user manual for the Iridium Pilot system. The readers of the manual include anyone who is using or intends to use this system. No specific skills are required to operate the Iridium Pilot. However, it is important that you observe all safety requirements listed in Section 1.5 of this manual, and operate the system according to this manual's guidelines.

Note that this manual does not cover installation of Iridium Pilot. For information on installation refer to the Installation Guide.

1.2 Manual Overview

This manual has the following sections:

- **Introduction** — Contains an overview of the Iridium Pilot product as well as an overview of the Iridium network and how Iridium Pilot utilizes Iridium OpenPort service to provide data and voice services to customers. Important safety information is also included in this section.
- **Getting Started** — This section provides the user with an overview and safety check to begin operating the unit after install. Details on SIM installation and validation as well as data and phone connections are detailed.
- **System Configuration** — Explains LAN settings for configuring the Iridium Pilot on the customer's network. User profiles are defined and details are provided on how to access the Graphical User Interface and other features of the system.
- **System Operation** — Details are provided on how to operate the data and telephony services of the system, including placing data and voice calls and features of those calls provided by the service.
- **Troubleshooting** — Contains details to assist the user in troubleshooting issues by providing an LED status chart and troubleshooting guide.
- **Appendices** — Additional information for users of the Iridium Pilot system, including, regulatory references, product specifications and warranty information.

This manual may not always reflect the latest software functionality for your terminal.

1.3 Terms to Know

- ADE: Above Decks Equipment, the radiating (satellite) unit
- BDE: Below Decks Equipment, the user interface unit that connects to your computer system and telephone(s)
- IBSU: Iridium Broadband Subscriber Unit (The ADE and BDE together)
- POTS: Plain Old Telephony System
- SIM: Subscriber Identity Module
- PSU: Power Supply Unit
- Provisioned: A term used to indicate the SIM card is activated for voice and data connection. This can only be done by a Service Provider

1.4 Related Documents

Title and Description	Document
Installation Guide	Explains how to install the Iridium Pilot ADE/BDE.

1.5 Safety

1.5.1 Electrical Shock Warning

The ADE and the BDE should be installed by a qualified professional technician trained in the installation of marine electronics and antennas. Failure to comply with these precautions or with specific warnings on the equipment, in the Installation Guide or in this manual violates the safety standards of the design, manufacture and intended use of this equipment.

⚠ WARNING

Prior to using Iridium Pilot, read and understand this User Manual including the safety warnings and information. Failure to do so could result in serious injury or death.

If you do not have the Iridium Pilot Installation Guide, it can be found at www. iridium.com, or call 1-866-947-4348 and request that an Installation Guide be sent to you.

Follow all safety precautions carefully. Improper installation may result in injury or inability of the equipment to function properly. Only a qualified professional technician trained in the installation of marine electronics and antennas should remove the installation cover on the BDE.

Iridium Satellite LLC disclaims all liability for failure to comply with these requirements and improper installation.

Shock Hazard

⚠ WARNING

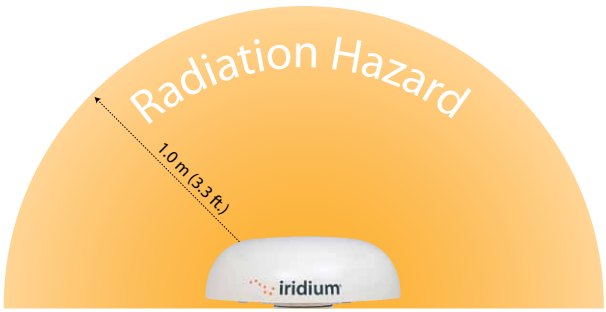
The Below Decks Equipment (BDE) contains low voltage that may cause serious injury if opened or not grounded. Ensure the unit is properly grounded before operation and do not, under any conditions, open or dismantle the BDE. Failure to follow these instructions could result in serious injury or death.

1.5.2 Radiation Hazard

Potentially hazardous radio frequency (RF) is transmitted from ADE.

To avoid risk to personnel keep the following distances between personnel and the antenna when the system power is ON. Personnel must maintain a minimum separation distance of 1m from the unit and installers must place the Above Deck Equipment transmitter in a manner to maintain this minimum spacing requirement.

Figure 1.0



Description	Minimum Distance from Antenna
Within 0° - 180° of the antenna elevation range	1.0 m (3.3 ft.)

⚠ WARNING

The Above Decks Equipment (ADE) transmits radio frequency energy (RF) that may cause thermal injuries including tissue damage from increased heating and body temperature. When the system power is ON keep all personnel a minimum of 1.0 m (3.3 ft.) from the antenna (see Radiation Hazard). Failure to do so could result in serious injury or death.

1.5.3 Antenna mounting and substitution

The antenna supplied by the manufacturer or radio dealer must not be mounted at a location such that during radio transmission, any person or persons can come closer than the indicated minimum safe distance to the antenna: 1.0 m (3.3ft).

To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance shown above, and in accordance with the requirements of the antenna manufacturer or supplier.

Base Station Installation: The antenna should be mounted on an outdoor permanent structure. RF Exposure compliance must be addressed at the time of installation.

You may contact your radio dealer or the manufacturer for further instructions. You, as the qualified end-user of this radio device, must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF Exposure compliance. The operation of this transmitter must satisfy the requirements of Occupational/Controlled Exposure Environment, for work-related use. Transmit only when person(s) are at least the minimum distance from the properly installed, externally mounted antenna.

If you have any concerns about the adequacy of the mounting or support for the Iridium Pilot device, seek advice from a structural engineer or other qualified individual.

⚠ WARNING

Exposure to radio frequency energy (RF) from the antenna may cause thermal injuries including tissue damage from increased heating and body temperature. Keep everyone at a safe distance from the antenna when the system power is ON. Personnel must maintain a minimum separation distance of 1.0 m the from unit and installers must place ADE transmitter in a manner to maintain minimum spacing requirement. Failure to do so could result in exposure to radio frequency energy (RF) transmitted from the ADE that could result in serious injury or death.

⚠ WARNING

Exposure to radio frequency energy (RF) from the antenna may cause thermal injuries including tissue damage from increased heating and body temperature. Do not substitute any antenna for the one supplied or recommended by the manufacturer or radio dealer. Substitution of antennas could cause exposure to excess radio frequency radiation which could result in serious injury or death.

⚠ WARNING

ADE must be properly mounted and secured to vessel. Failure to do so could result in detachment of the unit, causing disruption in operation of the unit, or danger from a falling unit, which could result in serious injury or death.

⚠ CAUTION

Damage to the paint coating may allow rust to the ADE which could result in failure of the ADE. This in turn could cause disruption in operation of the Iridium Pilot device or danger from a falling unit. Avoid damaging the paint coating. If damage occurs, re-apply appropriate anti-corrosion paint. Failure to do so could result in serious injury or death.

1.5.4 Blasting Areas

⚠ WARNING

To avoid interfering with blasting operations, turn your device OFF when in a "blasting area" or in areas posted: "Turn off two-way radio." Obey all signs and instructions. Failure to do so could result in serious injury or death.

1.6 Overview of System Operation

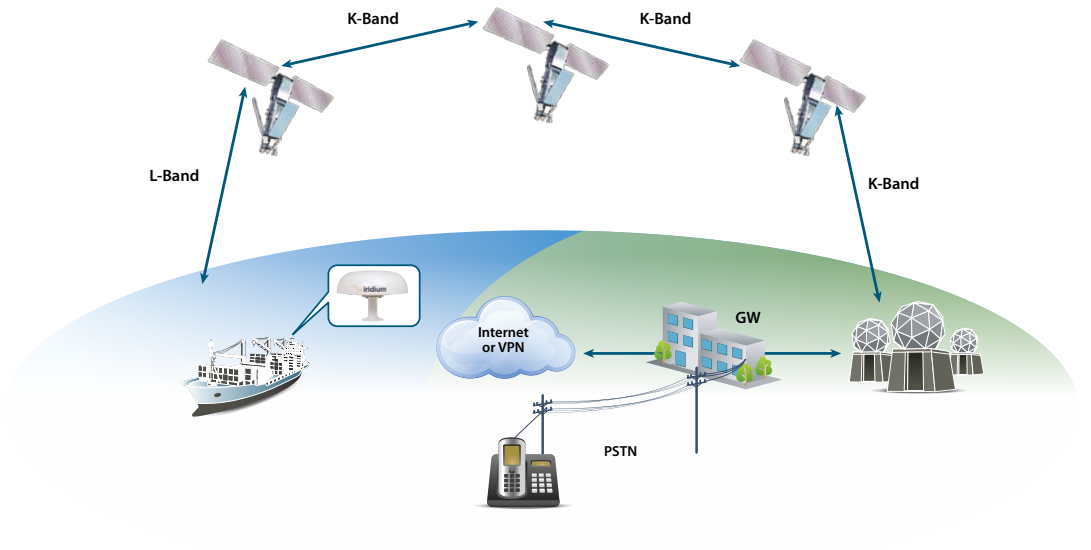
1.6.1 Iridium Satellite Communications

The Iridium satellite network is comprised of 66 low-earth orbiting (LEO), cross-linked satellites, providing voice and data coverage over Earth's entire surface. The satellites operate as a fully meshed network in six orbital planes, positioned at a height of 781 kilometers (485 miles) with one satellite every 32 degrees of latitude, with each satellite completing one orbit every 100 minutes, traveling at a rate of 16,832 miles per hour. Each plane has 11 mission satellites performing as nodes in the telephony network. The spare satellites are on orbit ready to replace any unserviceable satellite. Iridium has gateways in Arizona, Alaska and additional telemetry, tracking and control facilities in Canada and Norway. It is the largest commercial satellite constellation in the world.

This constellation ensures that every region on the globe is covered by at least one satellite at all times. Each satellite is cross-linked to four other satellites; two satellites in the same orbital plane and two in an adjacent plane. The satellite constellation is expected to provide continuous global coverage until 2018 without any additional launches of satellites.

Figure 1.2

An Iridium Pilot voice or data call is received by the closest satellite to the device's current location, anywhere on the Globe. The traffic is routed through the meshed satellite network and lands at the Alaska Ground Station, and, is then routed over terrestrial networks to the Gateway in Arizona. At the gateway, traffic is converted back to internet protocol (IP) and voice, depending on call type and delivered to the IP cloud or the public switched telephone network (PSTN).



1.6.2 Iridium Pilot Terminal Components

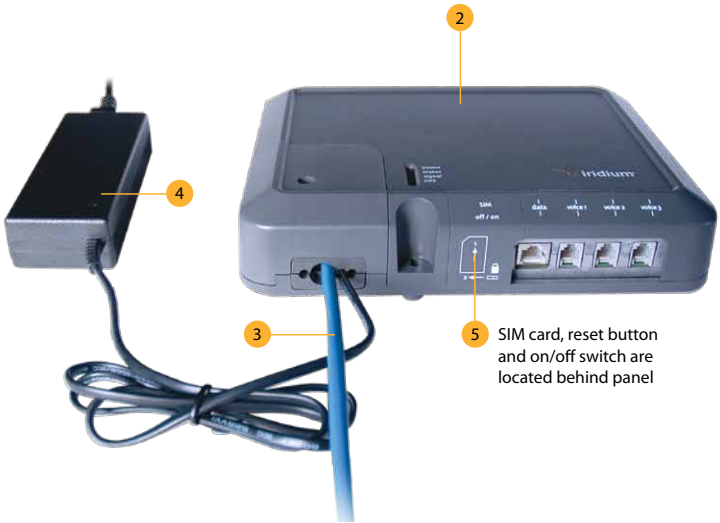
Figure 1.3

Above Decks Equipment

The Above Decks Equipment (ADE) provides the communication connection between the BDE and Iridium's satellites. The ADE will automatically locate and track Iridium satellites overhead.

Below Decks Equipment

Figure 1.4



2. **Below Decks Equipment:** The Below Decks Equipment (BDE) is the appliance to which you connect your telephones and computers. It is capable of handling three POTS/RJ11 telephone handsets and one Ethernet data connection.
3. **ADE / BDE Cable:** The cable connects the ADE to the BDE. It is shielded and has a waterproof connection for the ADE.
4. **AC Power Supply Unit:** The AC Power Supply Unit (PSU) provides power to the BDE.
5. **POTS Handsets (see page 5.2):** Two handsets are provided with your Iridium Pilot Equipment: a Standard Phone for installation on the bridge, and one Crew Phone, designed for quick access to Iridium GoChat™ Crew Calling services.
6. **SIM:** The assigned SIM card validates the system at start-up, allows connection to the Iridium network, and enables the appropriate phone and data lines.

1.6.3 Product Specifications

See Appendix B for product specifications.

Section II – GETTING STARTED

2.0 Getting Started

2.1 SIM Installation

Steps

1. Remove SIM cover (retain somewhere safe) and ensure ON/OFF switch is in OFF position.
2. Insert suitable SIM card and slide the locking tab across (see Figures 2.1, 2.2, 2.3).
   a. **Note:** If the SIM card is removed or unlocked during operation any voice or data calls will be terminated immediately.
3. Power on and replace the SIM cover.
4. Connect computer/router via Ethernet port.
5. Connect phones and/or PBX via RJ11 ports.
6. Check all connections.

Figure 2.1

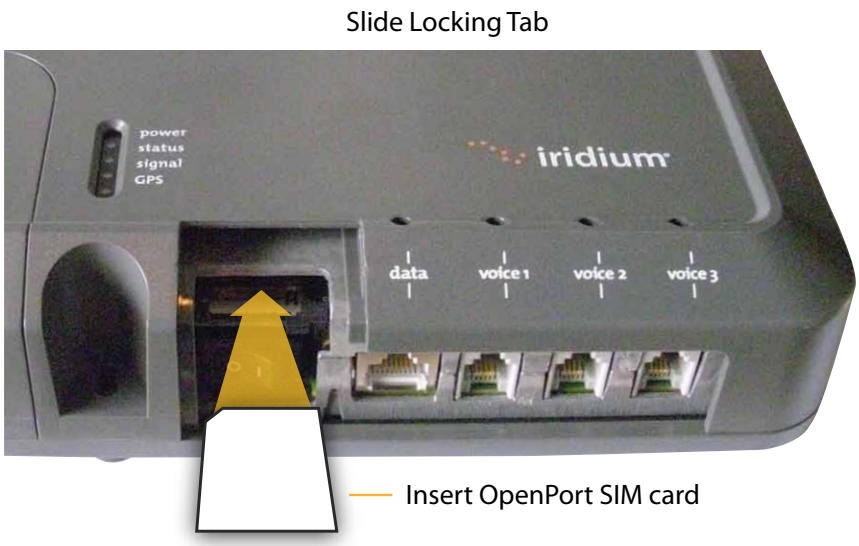
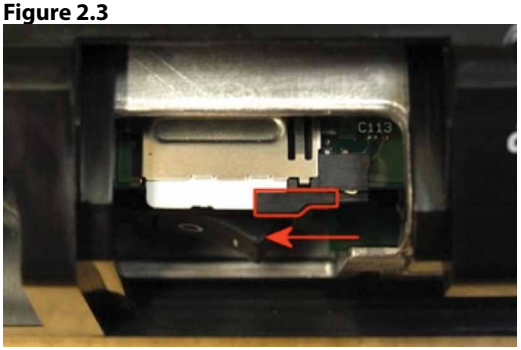


Figure 2.2

Figure 2.3



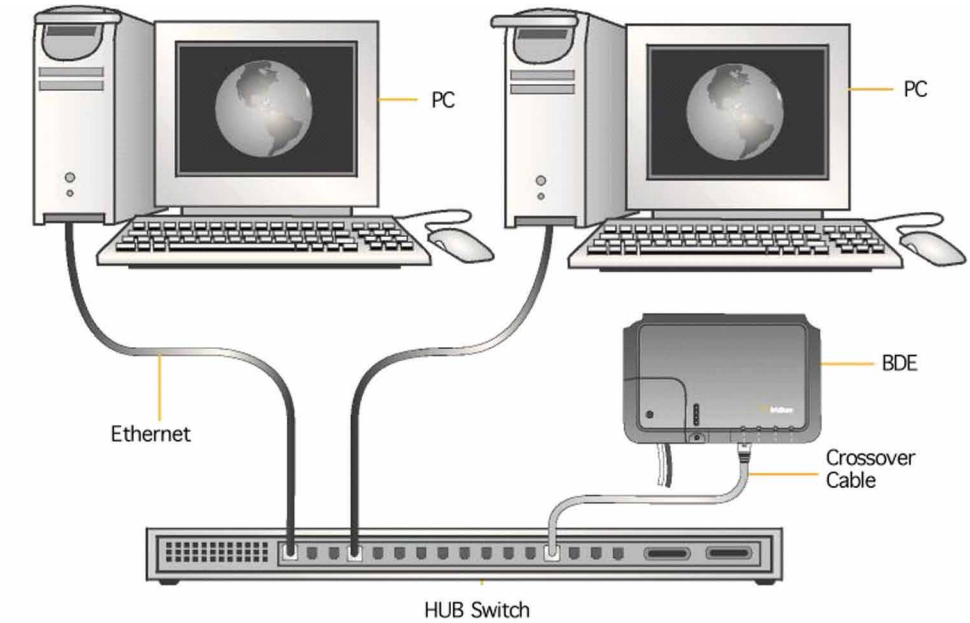
2.2 Data Connection

The BDE provides one RJ-45 port for connection to your computer or network.

The internal structure of the computer network depends on your needs. The Iridium Pilot is capable of handling everything from the connection of a single PC to a complete Ethernet network. The data port provides an Ethernet connection of 10BaseT using an RJ45 connector.

If the Below Decks Equipment (BDE) is to be connected to a down-stream port of an Ethernet hub or switch then the user will need to use a crossover Ethernet cable. Again, the data port must be provisioned to connect to the Internet. The data LED will be illuminated green.

Figure 2.4



2.2.1 Single PC Connection

- Connect directly to the data port of the BDE
- Use a standard Ethernet cable
- Configure PC for static configuration (for more details see Windows® PC Set-up for Static Configuration)

2.2.2 Multiple PC Connection

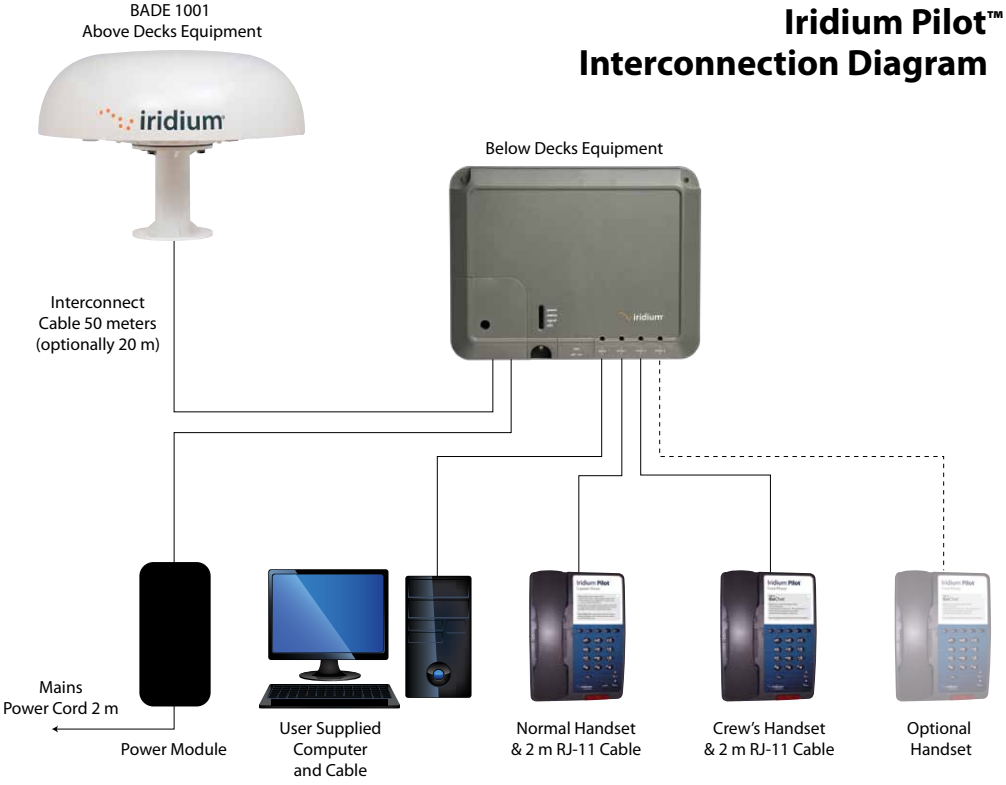
- Connect the switch/hub/router to the data port on the BDE using a crossover Ethernet cable.
- Connect the PCs to the Ethernet switch, hub or router (Note: these multiple devices will be sharing the same satellite connection over the Iridium network, the more devices connected the smaller the share of the connection.)
- Depending on how your ship-side LAN is configured you may or may not want the Iridium Pilot to act as a DHCP server and to perform DNS forwarding (see the following section to change).

See the Data Operation section for more information on configuring the data connection.

2.3 Phone Connection

The BDE provides three connectors for POTS handsets, which can be used simultaneously. In order to make or receive a phone call you must have a valid SIM installed in the BDE.

Connect the handsets to the RJ-11 ports on the BDE.



2.4 Connection Check

Check all connections before powering the system on.

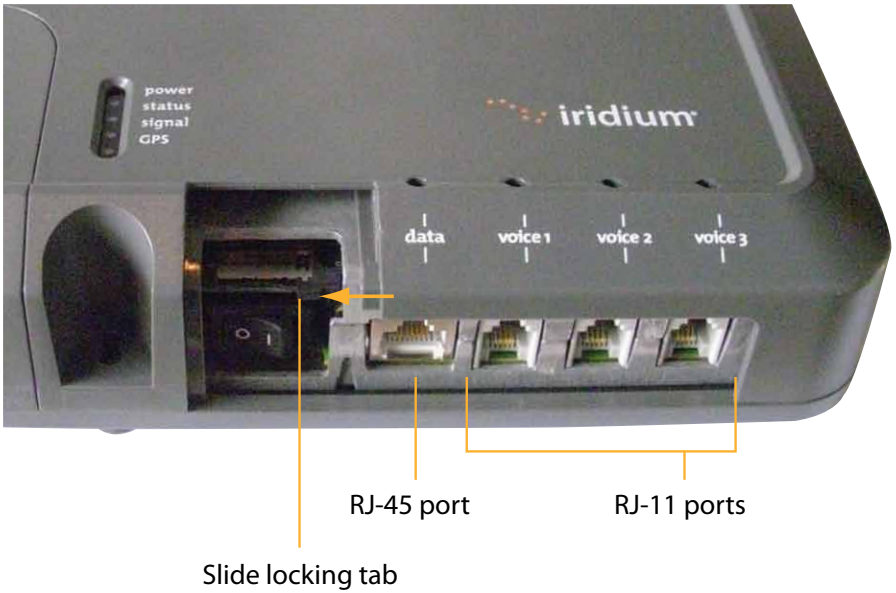
2.5 System Safety Check

Now that the system has been set up by the installer and is ready for use, once it is turned ON, it is important to conduct the following checks before using the system:

1. Ensure that your equipment is properly grounded and there is power to the units.

2. Make sure the valid Iridium Pilot SIM card is installed in the SIM holder and the SIM card slide locking tab is in the correct position. RJ-45 port is connected to a computer, switch, router or server, and RJ-11 ports are connected to handsets. (Figure 2.5)

Figure 2.5



2.6 Starting the System

1. On the BDE, press the on/off Power Switch located under the SIM cover. The system authentication will occur and the ADE will automatically establish a link with the Iridium network.

Figure 2.6

Note: If the on/off Indicator Light is not green, see Chapter 5, Troubleshooting the BDE.

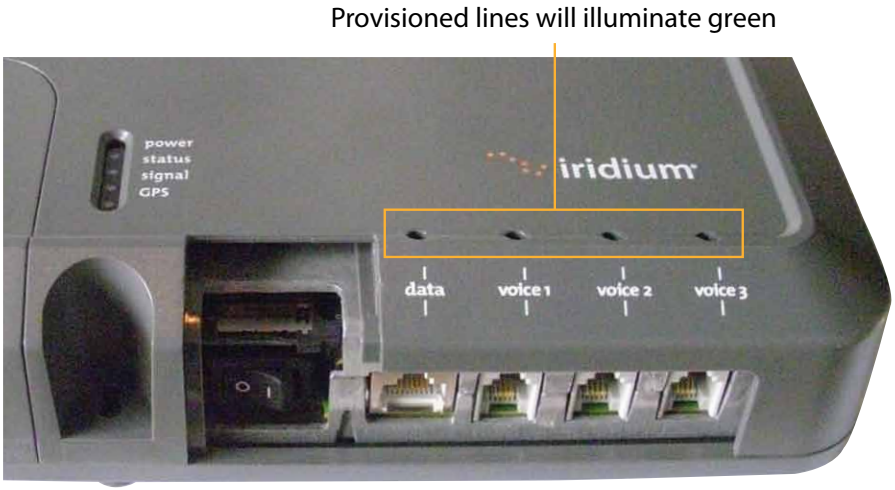
2. Turn on your computers or network.

2.7 SIM Validation & LED Indicators

In order to access the Iridium network the BDE must have a valid SIM card installed. The number and type ("Standard" or "Crew") of voice lines available is set when your Service Provider provisions (enables) the SIM card.

The BDE will indicate (illuminate green) the lines that have been provisioned.

Figure 2.7



For example: There are three phone lines available but you choose to only provision one of them. Upon system activation only one phone line will be available.

Your service provider is the only party capable of provisioning voice and data lines. Contact your service provider to add or delete phone and data lines. Once the service provider has provided the appropriate line(s), this information is automatically downloaded to the Iridium Pilot the next time you access the network.

Note: If the SIM card is removed or unlocked during active voice or data calls, they will be terminated immediately. In this case, the SIM must be reinserted and SIM card slide locking tab must be in its correct position, then the BDE unit must be powered on/off again to be reactivated.

Check LEDs as expected :

- Power LED is green; power is being provided to the BDE and it is switched on.
- Status LED is amber (green when in use); BDE and ADE can communicate, idle.
- Signal LED is amber or green; ISU can see satellite network (red = no signal, amber = marginal signal, green = acceptable signal).
- GPS LED is green; ISU knows where it is.

Section III – SYSTEM CONFIGURATION

3.0 System Configuration

Configuring the system and full diagnostics can only be done by the System Administrator and requires a login password. The default user name and password is "admin". Change the password if desired.

3.1 Network Configuration

Configuration of LAN Settings

The Iridium Pilot Terminal allows you to configure the following LAN settings, via the web pages when logged on as 'admin'. These settings include:

- IP Address
- Subnet Mask
- DHCP Server and IP Address Range to Use
- DNS Forwarding

IP Address

This is the IP address of the Iridium Pilot unit as seen from the vessel. The factory default is 192.168.0.1. You should not change this default unless there is already LAN equipment on the vessel, in which case you must set this to an unused IP address of ship-side LAN.

Subnet Mask

This defines the subnet used on the vessel. The factory default is 255.255.255.0. You should only change this default if you change the IP address of the Iridium Pilot unit. All network devices must use the same subnet in order to communicate with one another.

Dynamic Host Configuration Protocol (DHCP) server

This automatically provides unique IP addresses and appropriate configuration parameters to each network device connected to the Iridium Pilot unit. In the current configuration, DHCP is disabled.

Note: While DHCP is disabled, devices connected to the Iridium Pilot unit will need to have their network settings manually configured. There must only be one DHCP server on any network segment. Please see insert on "how to configure network connections manually with Windows®."

DHCP IP Address minimum and maximum

This sets the range of IP addresses for the DHCP server to use. The factory default is 192.168.0.2 to 192.168.0.254. The range specifies the maximum number of devices on the network. Both the maximum and minimum value must be in the same subnet.

Domain Name System (DNS) forwarding

DNS is used to convert network names (such as www.google.com) into the IP addresses needed to connect to the device. The factory default is disabled. The Iridium Pilot unit acts as a switching station so that it automatically forwards DNS requests to the appropriate DNSserver.

Once you change the LAN configuration and press the 'Update IP Configuration' button the Iridium Pilot will reboot to apply the configuration changes - this will drop any calls. Once the Iridium
Iridium Pilot has rebooted any connected network devices may take up to 10 minutes to automatically obtain new settings. During this switch over time the network devices may not be able to communicate with the Iridium Pilot or/and duplicate IP address settings can occur.

If you change the LAN settings it is advisable to reboot any attached devices to avoid this issue

Note: The LAN Settings can be reset to the factory defaults using the reset switch on the BDE.

Exactly how you configure the network clients on the vessel will vary depending on the operating system. Refer to your operating system manual or technical support organization to obtain the exact details to achieve this. You should normally use the Iridium Pilot DHCP server to automatically configure the correct client settings. If you use this option the clients must be setup to obtain their settings automatically. This is the easiest way to setup a network.

If you use a static configuration you must ensure that the IBSU is the default gateway, that the IBSU is on the same subnet as all devices and each network address is unique.

3.2 Client Configuration

Windows® PC Set-up for Static Configuration

Depending on the needs of your computer network, it may be necessary to assign a static IP address to the computer directly connected to the Iridium Pilot unit. The following steps cover a Windows XP® configuration, however, they can generally be applied to all Windows® setups. For additional assistance in configuring your desktop computer for a static connection please contact your local computer administrator.

1. Open Network Connections located in the Control Panel.
2. Locate the icon for the Local Area Connection connected to the Iridium Pilot unit and right-click Properties.
3. From the list of connections used, highlight Internet Protocol (TCP/IP) and click Properties

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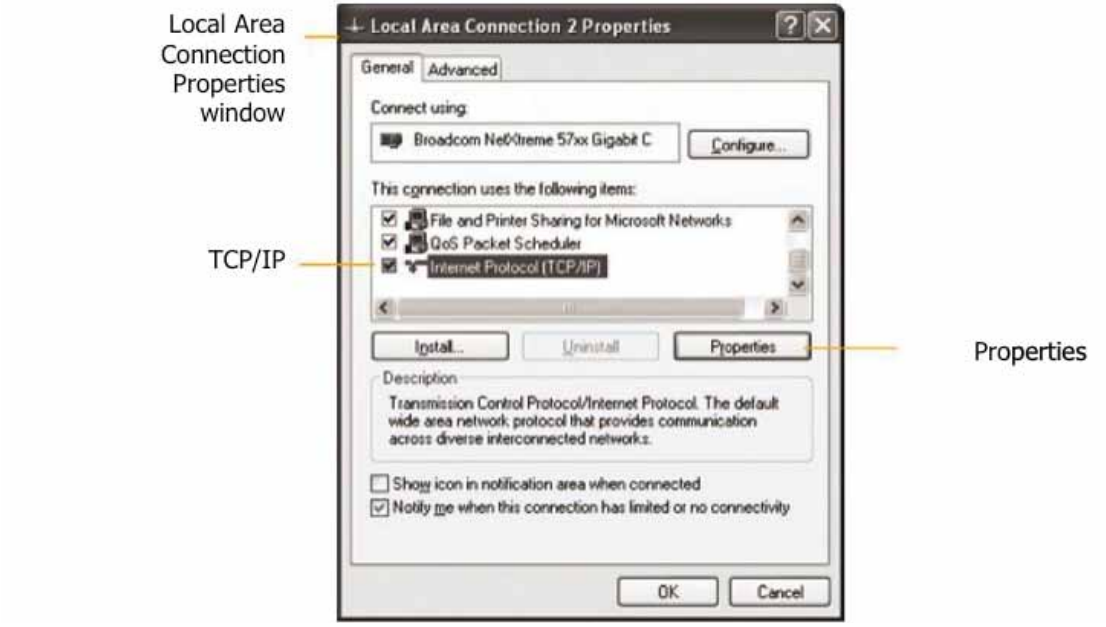
Windows XP are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Figure 3.0

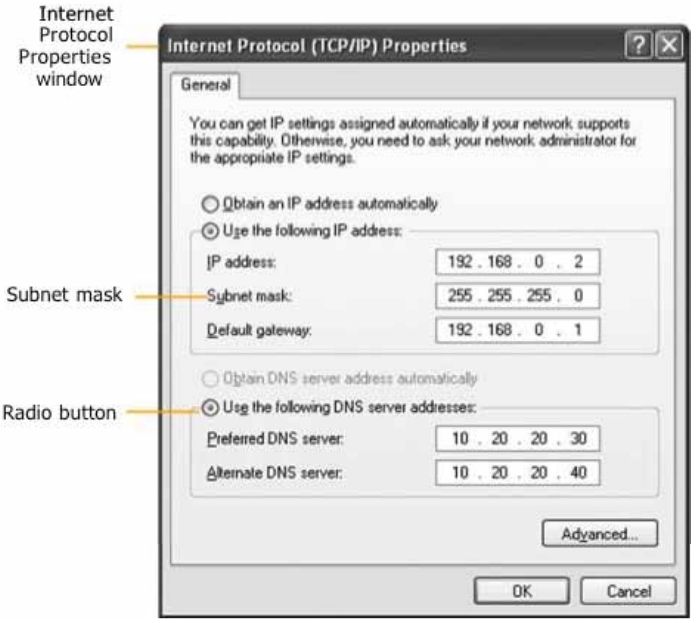


4.On the Internet Protocol (TCP/IP) Properties page, click the radio button. Use the following IP address: and enter an IP address to be used by this computer.

Note: This IP address should be different from the Iridium Pilot unit while still being in the same IP range. For example, if the Iridium Pilot unit is configured as 192.168.0.1 (default), then a computer connected to the IBSU must be configured within the IP range 192.168.0.x where x is anything between 2 and 254.

5. Next, set the Subnet mask: to 255.255.255.0
6. Enter the IP address of the Iridium Pilot unit for the field marked Default gateway.
7. Lastly, check the radio button for Use the following DNS server addresses: and enter the DNS server address provided by your Service Provider for the Preferred DNS server address. If an address is not provided use the Iridium Pilot unit's IP address as shown below.
8. Click OK to close any open properties pages.

Figure 3.1


Internet Protocol Properties window
Subnet mask
Radio button
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 0 . 2
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 0 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 10 . 20 . 20 . 30
Alternate DNS server: 10 . 20 . 20 . 40
Advanced...
OK
Cancel

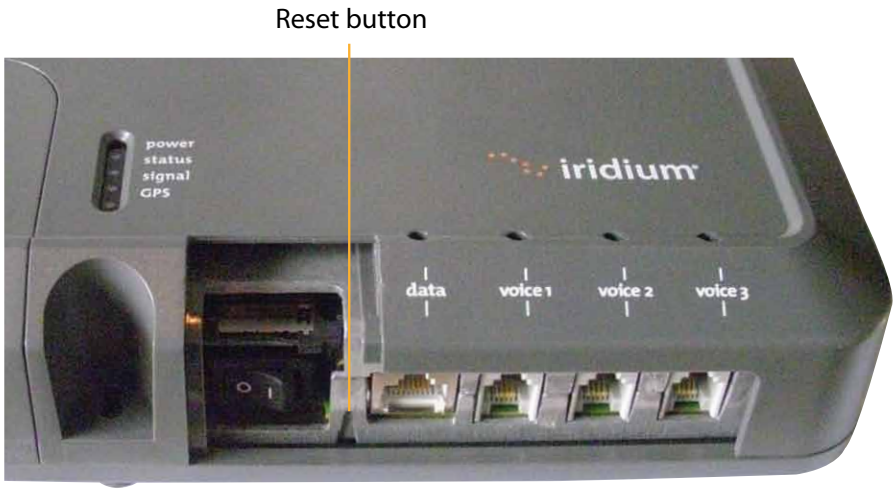
3.3 Accessing the Graphics user Interface (GUI)– IBSU Web Pages

To access the IBSU Web Pages:

1. Connect a PC to the data port on the BDE
2. Open the web browser and in the web browser address window, type: http://192.168.0.1.

Note: The default IP address is assigned to the IBSU at the factory. The IP address can be changed if there are multiple IBSU's at a single site. If this has been done, then type in the new IP address. To reset the IP address back to the default (192.168.0.1), press the network reset button on the BDE.

Figure 3.2



3. Select "Login" for administrator level diagnostics. Type in the user name and password specified by Iridium. Call your Service Provider if login fails.
4. Select the appropriate link:

Select to link to:

- Status
- Counters
- Diagnostics

Note: The information displayed on the web pages is not dynamically updated. To update the information, refresh the web page from you browser.

Figure 3.3

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Status

Select Status to link to Counters, Diagnostics, Configuration, and Admin Password. This page provides:

- LED Status
- Signal Strength
- SIM status
- GPS status, location
- Satellite Connection status
- Voice Line status

Figure 3.4

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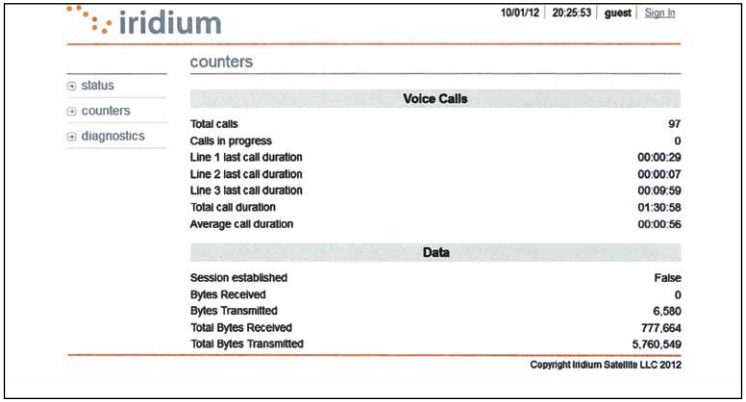
Counters

Select Counters to link to Status, Diagnostics, Configuration, and Admin Password. This page provides:

- Voice Call Information
- Data Use Information

Figure 3.5



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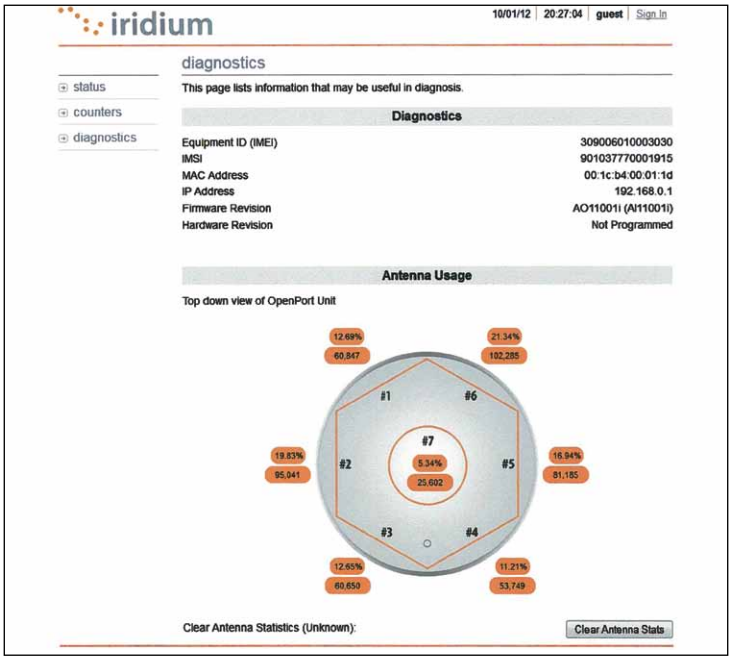
Diagnostics

Select Diagnostics to link to Status, Counters, Configuration, Admin Password and Antenna Utility Tool. This page provides useful diagnostic information such as:

- Equipment ID
- MAC & IP address
- Hardware & Firmware revision level

Figure 3.6



The Antenna array requires Admin login. You will not see this array unless you are logged in as Admin.

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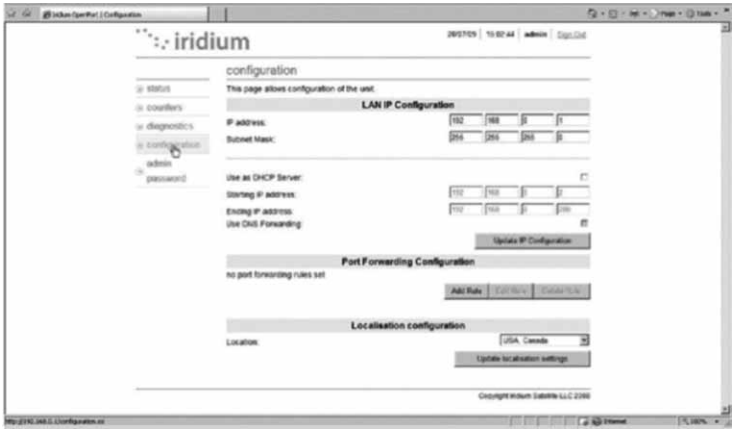
Configuration

Select Configuration to link to Status, Counters, Configuration and Admin Password. This page provides:

- LAN IP configuration
- Port Forwarding configuration
- Localization configuration

Figure 3.7



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3.4 Port Forwarding (Available firmware versions AO09004 and higher)

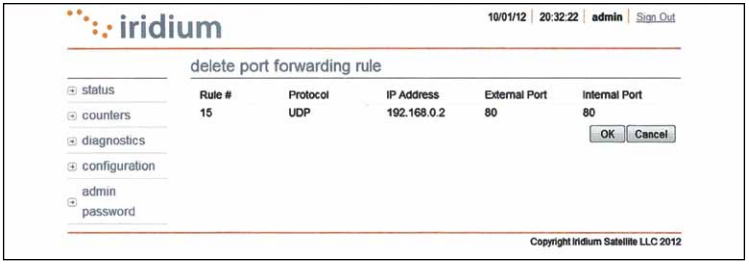
Port forwarding is taking a port on the outside of the Iridium Pilot, such as port 80 (typically used for web servers) and passing it to another machine on the internal network, on the same port (80).

Port redirection is taking a port on the outside, i.e. 80, and passing it to another machine on the internal network, but on a different port, i.e. 8080.

Before beginning the user will need to know what port they wish to forward from outside the Iridium Pilot, to the inner network, and whether or not they need to 'redirect' the port as well.They will also need to know if the data will be TCP or UDP.

1. From the Configuration screen in the GUI, Under Port Forwarding Configuration, Click 'Add Rule' (see Figure 3.5). An administration page will open (Figure 3.8), shown below:
2. Enter /Select the following:
   - The external port number to forward to the inside.
   - The internal port number which will be receiving the data. Note: If you are redirecting as well, this number will be different than the external port number.
   - The IP address of the computer which is receiving the data. Note: This will need to be on the same subnet as the Iridium Pilot IBSU.
   - The protocol for the data: TCP or UDP.

Figure 3.8



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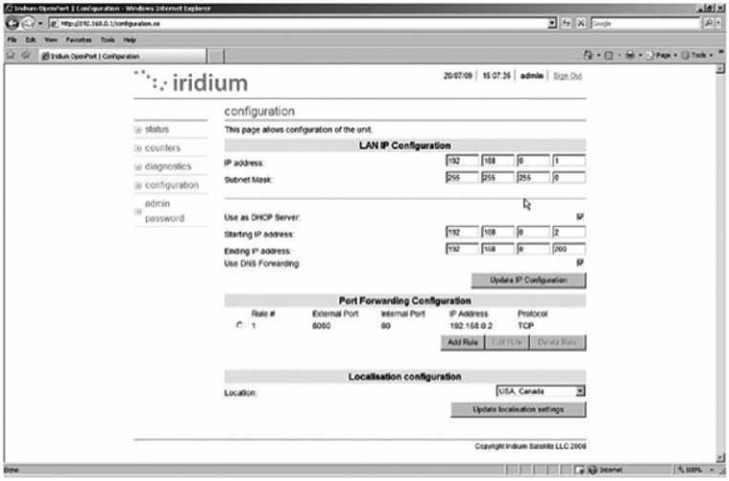
3.Click OK. The updated configuration page with the newly added rule is displayed.

Figure 3.9



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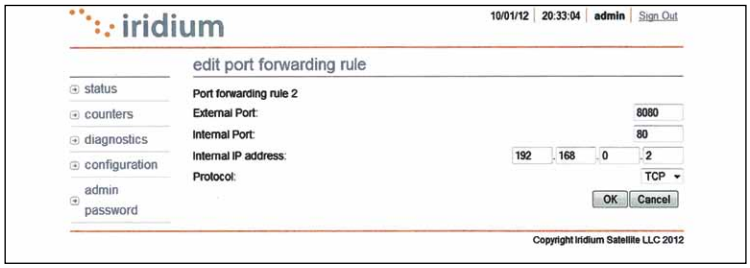
4. Add additional rules as needed.

Note: Rules can be turned on/off without having to be deleted.

Figure 3.10



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3.5 User Profiles

There are two user profile levels:

- Guest
- Administrator

The default access is Guest. No log-in is required.

3.5.1 Guest Level

The Guest level provides the user basic access to the system, but does not allow the user to make any changes to the system.

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3.5.2 Administrator Level

The Administrator level provides the user access to advanced configuration settings within the system.

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To change the Admin password, enter the current password (the default password is "admin") followed by your new password. Enter the new password a second time and clik the Change Password button. Your new password is now active.

3.6 Performance Enhancement Proxy (Available in versions AO12001 and higher)

Improved efficiency is provided through the Performance Enhancement Proxy (PEP) feature and data compression. PEP provides improved throughput for data connections that suffer data degradations. Transport efficiency is provided through reducing communication overhead by eliminating redundant information in IP headers. Additional compression can be achieved by reducing redundant information in the payload data, using ZLIB compression.

There are four options with data compression:

1. IP Header and ZLIB compression (default setting)
2. IP Header only
3. ZLIB compression only
4. no compression

To enable PEP, when logged in as Administrator, from the configuration page, select the PEP checkbox.

To disable PEP, de-select the checkbox.

To configure Compression, when logged in as Administrator, from the configuration page, select which option you want from the dropdown menu.

PEP configuration will not be accessible until Iridium Gateway update is complete.

3.7 Firewall (Available in versions AO12001 and higher)

The Iridium Pilot comes with an integrated Firewall, referred to as the Iridium Pilot ISU IP address white listing feature. There is an associated web interface to assist in configuring the feature. When the system is shipped, the default setting is for the feature to be disabled.

When enabled, the IP address white listing feature restricts mobile originated IP links to the set of IP addresses specified in the white list. Mobile terminated links are allowed from any IP address.

The maximum number of IP addresses that can be specified in the white list is 12.

If you are using Static IPs for DNS, or Iridium DNS servers, then the addresses must be added to the White List filtering. For Iridium DNS servers use:

- 10.20.20.30
- 10.20.20.40

Otherwise, the end user is unable to utilize a domain name, since the lookup to the DNS servers will be blocked. Due to this requirement, the maximum number of entries is 10, since there are 2 DNS servers.

Configuration of the white list is performed through the Pilot ISU's configuration web page under admin or gateway login.

To access the IP address white list configuration:

1. Login to the ISU to configure as either admin or gateway.
2. Navigate to the Configuration web page.
3. On the page you will see the White List Configuration section:

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To add an IP address:

1. Click the Add Address button.
2. This will take you to a page that allows you to enter an IP address:

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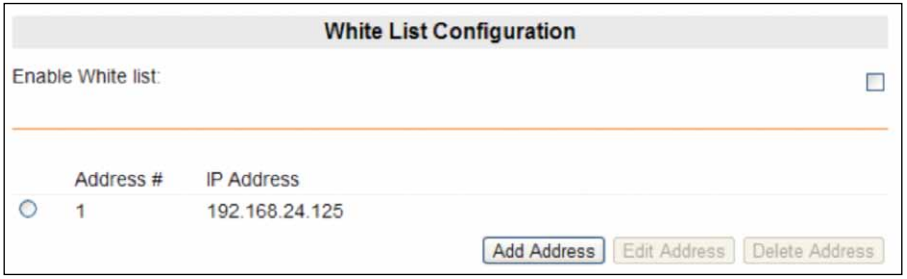
3. Enter an IP address and click OK.
4. You will be re-directed back to the Configuration page where the IP address will not be visible in the White List Configuration section.



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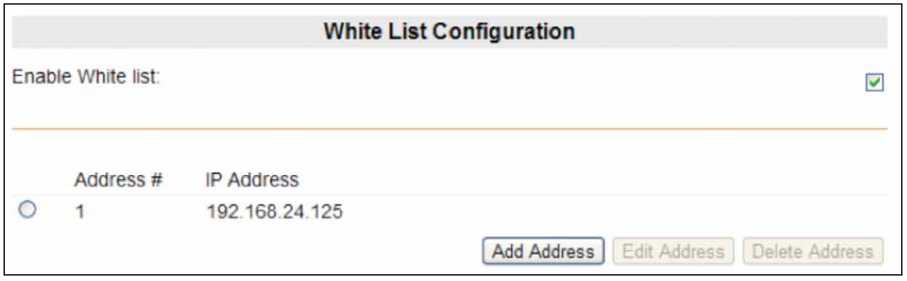
To enable the white listing feature:

1. Check the Enable White List checkbox:



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2. IP address white listing is now enabled and only the IP address entered will be accessible from the Pilot ISU

From the main status page, the feature will appear as shown when IP White Listing feature is enabled and no attempts are being made outside of the trusted list.

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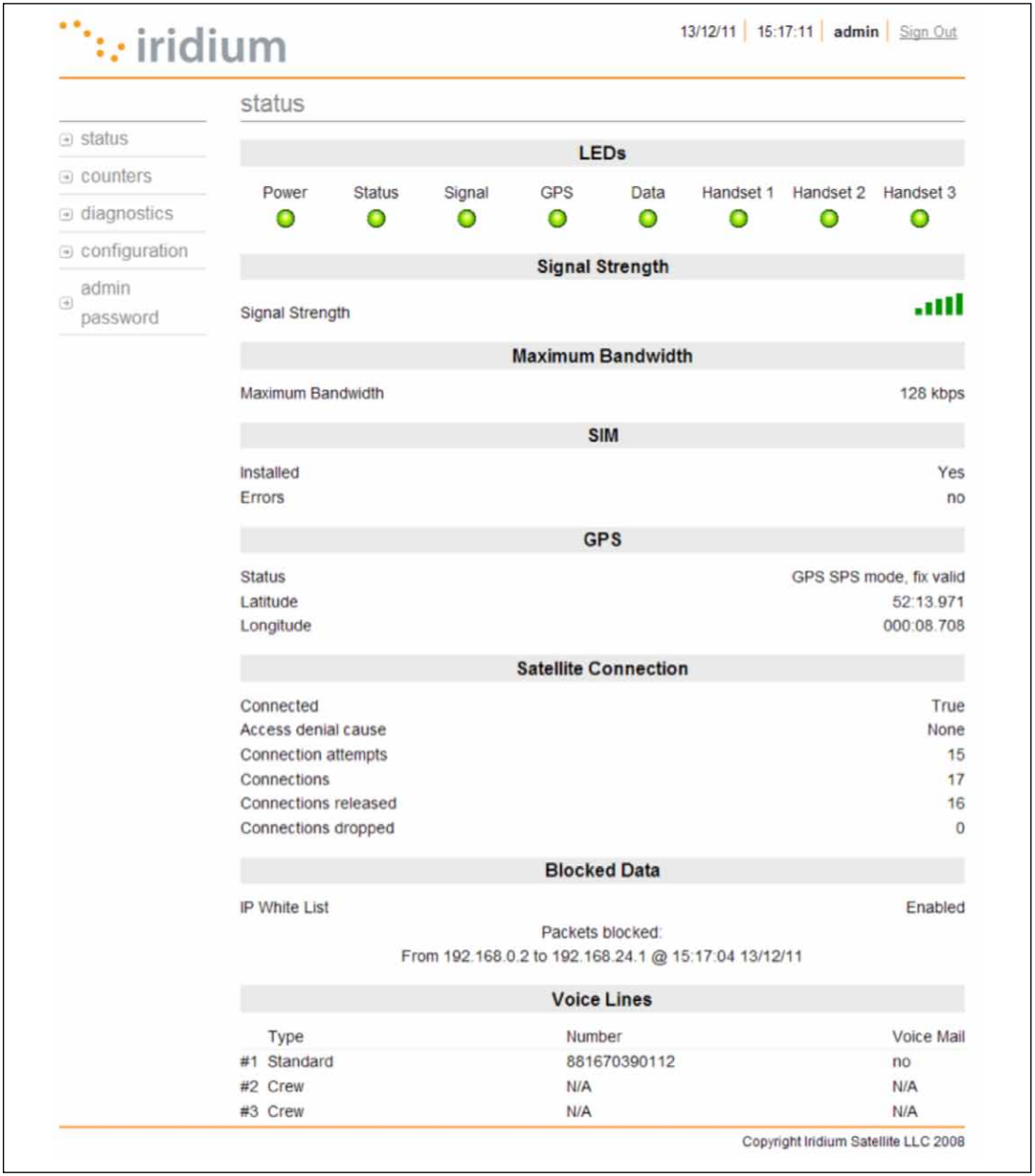
From the main status page, the feature will appear as shown when IP White Listing feature is enabled and attempts are being made to a single destination outside of the trusted list.

a. Timestamp reflects the time in GMT, of the last attempt that was made to reach the IP address indicated, that is NOT on the trusted list.



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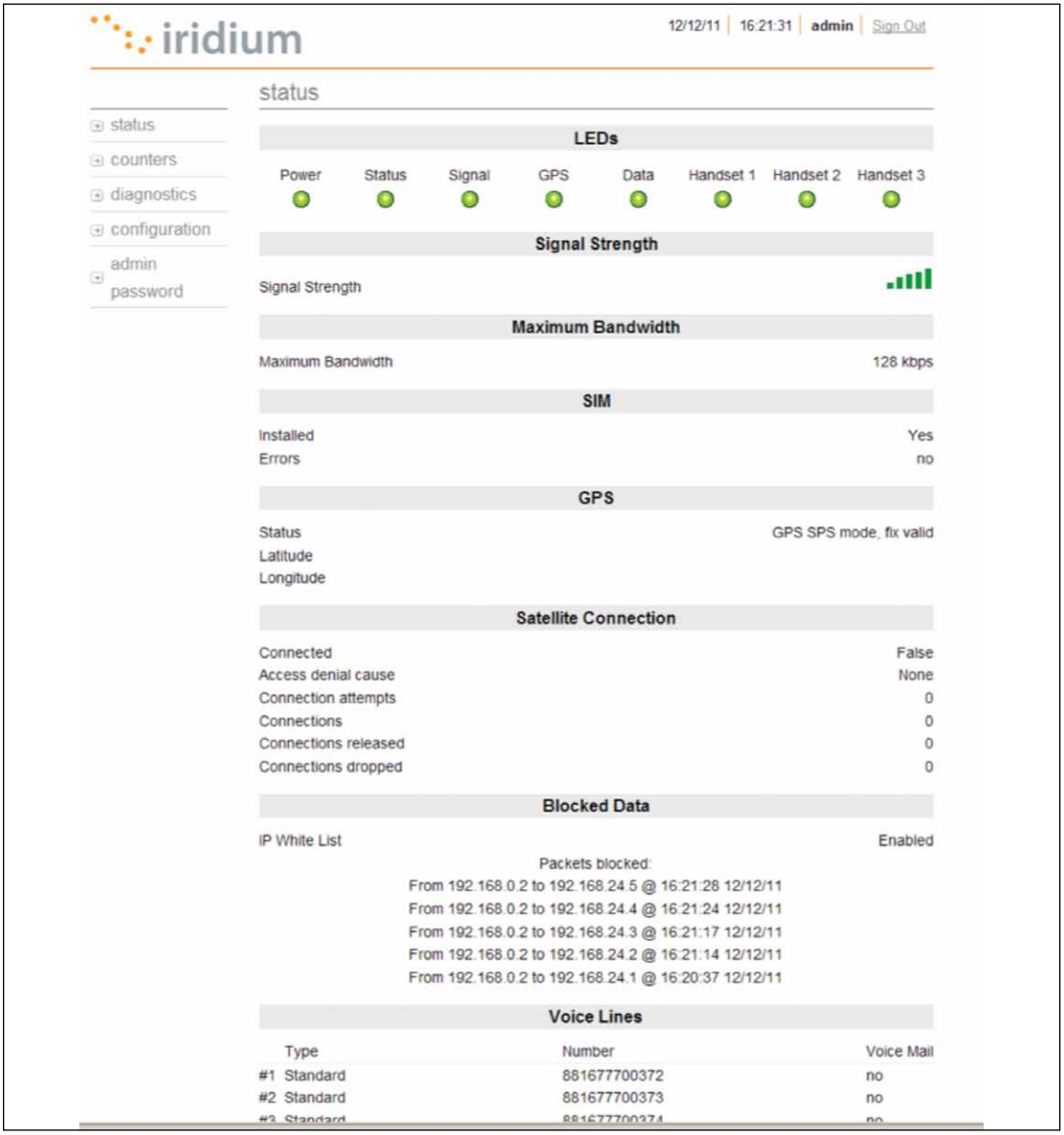
From the main status page, the feature will appear as shown when IP White Listing feature is enabled and attempts are being made to multiple destinations outside of the trusted list.

a. Timestamp reflects the last time an attempt was made to reach the IP address indicated, that is NOT on the white list.

b. Max number of entries shown will be 5.

c. These entries are "*cleared*", if the ISU is reset, or if attempts to access more than 5 blocked destinations. The oldest entry is then removed.



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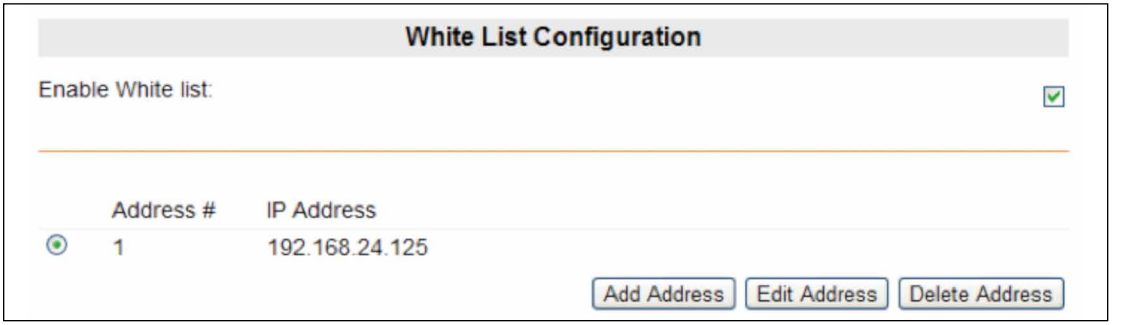
To disable IP address white listing

1. Uncheck the Enable White List checkbox.
2. IP addresses are removed from the list by selecting the radio button by the desired address and clicking the Delete Address button:



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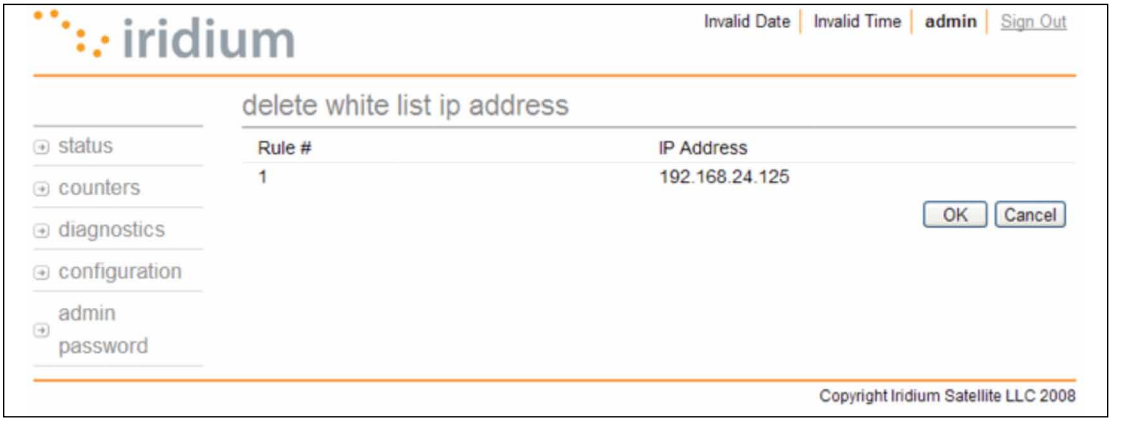
3. On the subsequent web page click OK and the address will be removed from the table:



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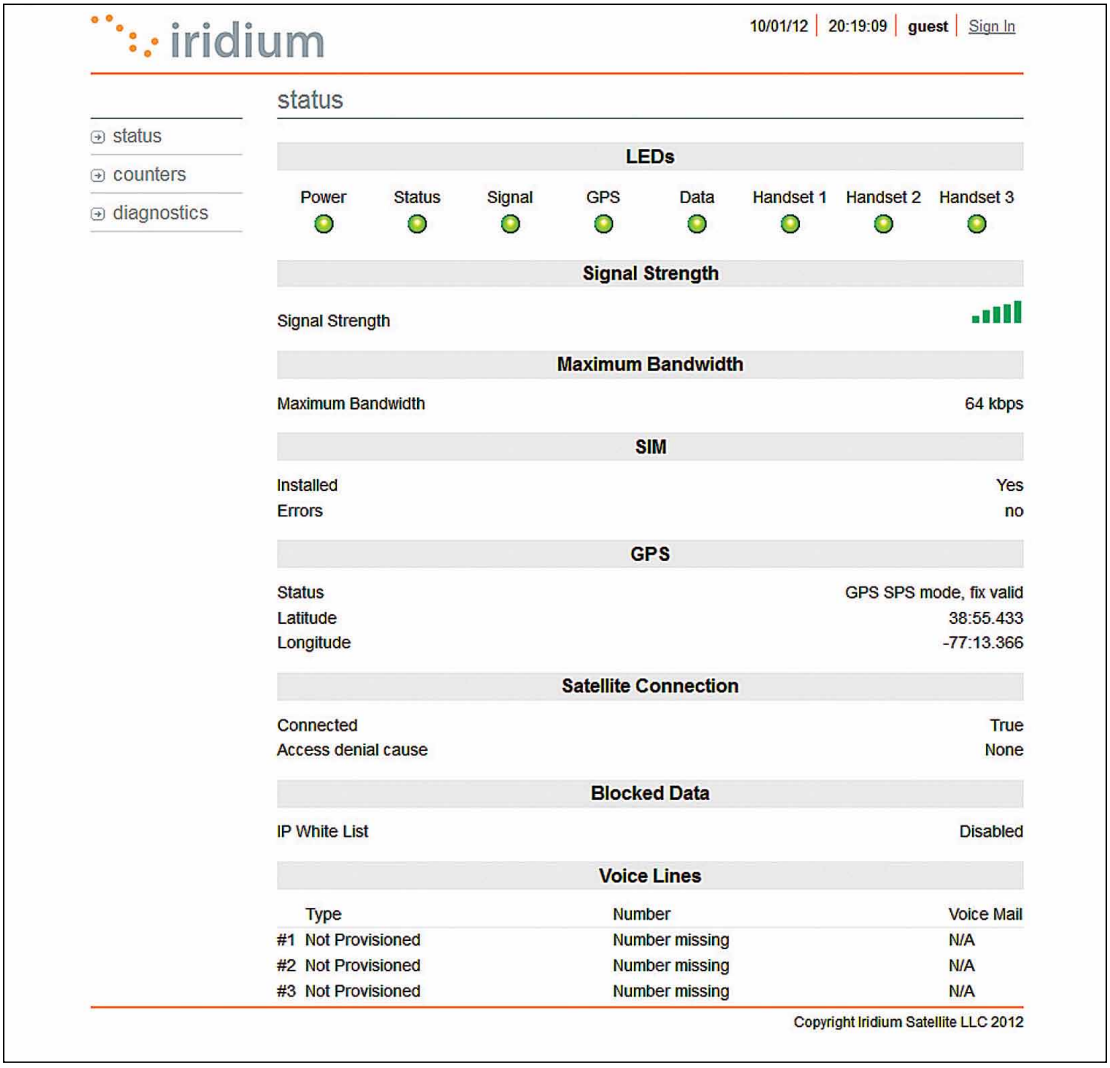
From the main status page, the disabled feature will appear as IP White Listing feature Disabled, as shown below:



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3.8 Bulk Configuration (Available in versions AO12001 and higher)

The Iridium Pilot comes with the Bulk Configuration Tool, which allows Solutions Partners and end users to configure multiple Iridium Pilot units being deployed across multiple locations.

Bulk configuration provides an easy way to fully configure a Pilot IBSU by applying a configuration defined by a plain text file. The bulk configuration file format consists of several lines where each line describes a single configurable element and is of the form:

ID	value

3.8.1 Bulk Configuration File

The ID is a string that identifies the configurable item to configure and value is the value to apply. The bulk configuration file supports several types of values: integer, string, enumeration, IP address and record.

VALUE	Description
Integer	An integer value can be in either decimal (e.g. 123) or hexadecimal (e.g. 0xABC) format.
String	A sequence of characters possibly surrounded by double quotes, quotes are required if the string contains spaces.
Enumeration	One of a fixed number of predefined strings, a string enumeration value may contain spaces if it is enclosed in quotes.
IP Address	Four decimal integers each separated from its neighbours by a single dot.
Record	An element that is composed of a fixed number of fields, each field is a value each of which is an Integer, String, Enumeration or IP Address the order the values appear is predefined.

Admin_Password	admin
IP_Address	192.168.0.1
DHCPS_Enabled	enabled
Compression_Mask	0x07
Port_Forward_Rule_1	UDP 192.168.0.5 55 66 yes

Admin_Password – String
IP_Address – IP Address
DHCPS_Enabled – Enumeration ("enabled" or "disabled")
Compression_Mask – Integer (in hex format)
Port_Forward_Rule_1 – Record made up of Enumeration ("UDP" or "TCP"), IP Address, Integer, Integer and Enumeration ("yes" OR "NO").

3.8.2 Element Definitions

Below is a description of the valid element IDs and the format expected for their associated configuration value.

ELEMENT	DESCRIPTION	EXAMPLE
Admin_Password	Configures the administrator's password for the ISU, takes a string as input.	Admin_Password password
IP_Address	Configures the IP address of the ISU, takes an IP address as input	IP_Address 192.168.0.1
Subnet_Mask	Configures the subnet mask of the ISU, takes an IP address as input.	
DHCPS_Enabled	Enables or disables the DHCP server functionality of the ISU, takes and enumeration of the format "enabled" or "disabled" as input.	DHCPS_Enabled disabled
DHCPS_IP_Start	Configures the start of the IP address range DHCP will allocate addresses from if enabled, takes an IP address as input.	DHCPS_IP_Start 192.168.0.2
DHCPS_IP_End	Configures the end of the IP address range DHCP will allocate addresses from if enabled, takes an IP address as input.	DHCPS_IP_End 192.168.0.10
DNS_Enabled	Enables or disables the DNS forwarding functionality of the ISU, takes and enumeration of the format "enabled" or "disabled" as input.	DNS_Enabled enabled
Port_Forward_Rule_X	Configures one of the 15 port forwarding rules on an ISU, takes a record of the following format: • IP address • Internal port number • External port number • Protocol (enumeration "UDP" or "TCP") • In use (enumeration "yes" or "no")	Port_Forward_Rule_1 192.168.0.5 55 66 TCP yes
NOTE: Configured port forwarding rules must be in a contiguous block starting with rule 1, otherwise unexpected behaviour may occur. For example configuring rules 1,2,3,4 would be fine, but configuring 1,2,8,9 would be wrong as would configuring rules 5,6,7.		

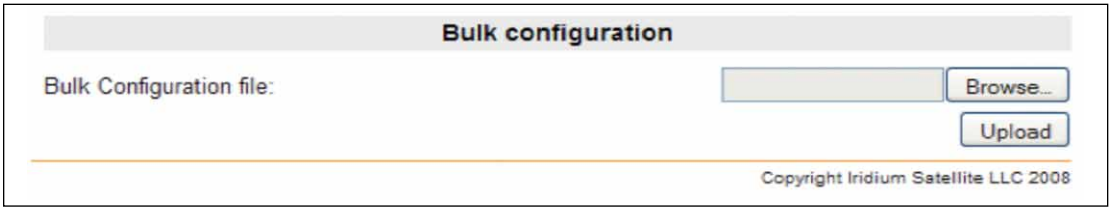
ELEMENT	DESCRIPTION	EXAMPLE
Localization	Configures the localisation setting of the ISU, takes an enumeration with one of the following possible values: "USA, Canada" "UK, Ireland" "Germany, France, Italy" "Spain, Portugal" China Japan	Localisation "Germany, France, Italy"
Whitelist_Address_X	Configures one of the 12 white listed IP addresses, takes an IP address.	Whitelist_Address_1 123.456.789.123
Note: Configured white list addresses must be in a contiguous block starting with rule 1, otherwise unexpected behaviour may occur. For example configuring addresses 1,2,3,4 would be fine, but configuring 1,2,8,9 would be wrong as would configuring rules 5,6,7.		
Whitelist_Enable	Enables or disables the use of the IP address white list, takes and enumeration of the format "enabled" or "disabled" as input.	Whitelist_Enable disabled
Whitelist_Size	Configures the number of configured white listed IP addresses, takes an integer.	Whitelist_Size 4
Note: The size configured here must match the number of Whitelist_Address_X entries in the configuration file otherwise unexpected behaviour may occur.		
Compression_Mask	Enables IP header compression, data compression and the Performance Enhancing Proxy (PEP), takes an integer. This is a bit mask of the services to enable: 0x01 – IP header compression enabled 0x02 – ZLIB data compression enabled 0x04 – PEP enabled	
Firmware_Notification	Enables or disables the new firmware available notification on the ISU's diagnostics web page, , takes and enumeration of the format "enabled" or "disabled" as input.	Firmware_Notification enabled

3.8.3 Uploading the Configuration

A configuration file can be uploaded to a Pilot IBSU in two ways, either via the IBSU's configuration web page or using the firmware upgrade tool.

To upload a configuration file via the IBSU web pages:

1. Login to the ISU web pages as an administrator
2. Navigate to the Configuration page
3. Locate the Bulk Configuration section at the bottom of the page.



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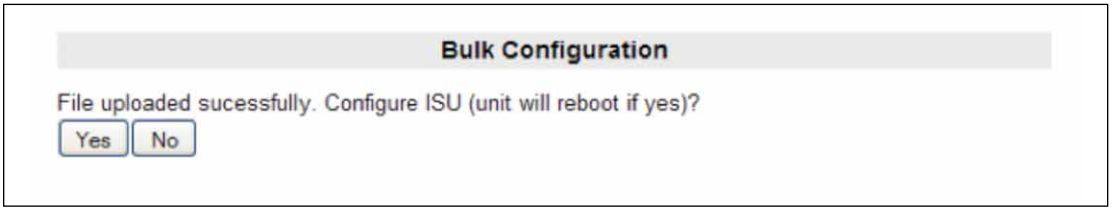
4. Click on the browse button and select an Openport configuration file from the dialog box.
5. Click Upload
6. When asked if you are want to configure the ISU click yes



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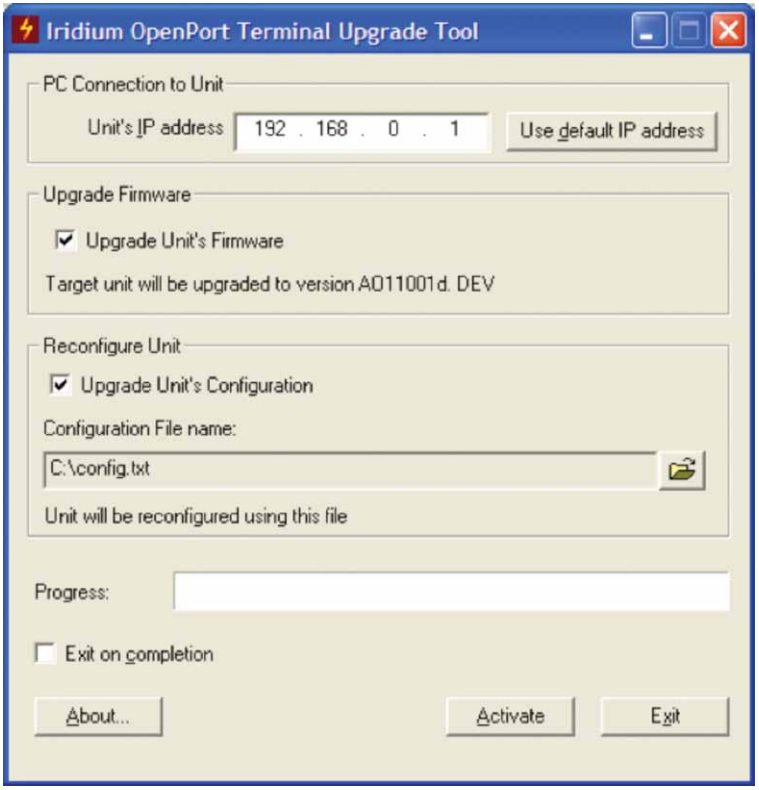
7. The new configuration will be applied and the ISU will reboot.

To upload a configuration file from the IBSU firmware upgrade tool:

1. Open the ISU firmware upgrade tool (must be AO11001 or later)
2. Enter the IP address of the ISU to configure
3. Select whether or not to upgrade the ISU's firmware by selecting or deselecting the Upgrade Unit's Firmware check box. Note that if the ISU's current firmware is older than AO11001 then this must be checked for the configuration process to work.

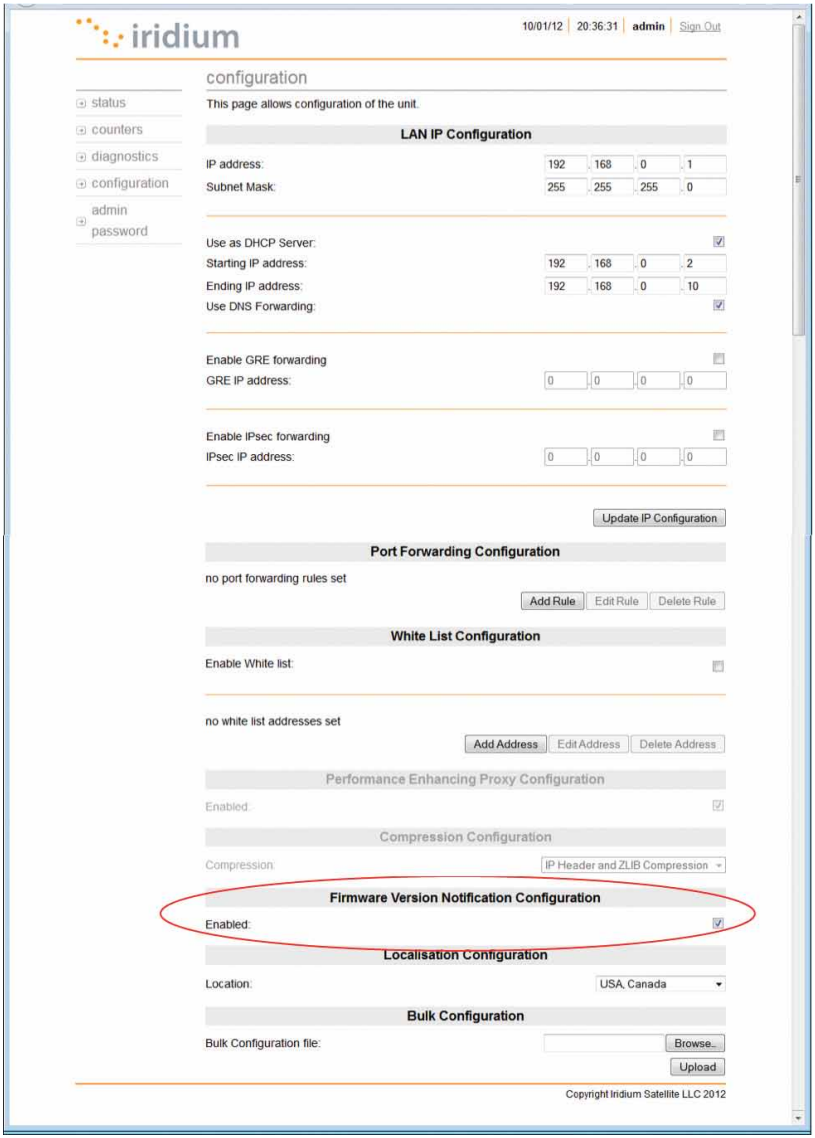


4. Check the Upgrade Unit's Configuration check box.
5. Click on the file browse icon in the Reconfigure Unit box.
6. Select the configuration file from the dialog box.
7. Click Activate.

3.9 New Firmware Notification (available in version A012001 and higher)

The Iridium Pilot comes with a New Firmware Notification feature, which allows you to manage the firmware upgrade process, as detailed in section 4.3 of this User Manual. An automated notification is provided on the Device Configuration page of the IBSU GUI, indicating a newer version is available.

To enable this feature, when logged in as Administrator, under Configuration, Select the checkbox.



You must contact your Iridium Solutions Provider to be upgraded.

To disable this feature, when logged in as Administrator, under Configuration, de-select the checkbox.

Section IV – System Operation

4.0 System Operation

Now that the system has been set up and configured, it is ready for use. This chapter provides details on how to use the Iridium Pilot system.

4.1 Data Operation

Prior to operation, the Iridium Pilot unit must be installed, provisioned, and switched on.

All status lights should be nominal.

- Power LED must be green. Power is being supplied to the BDE and it is switched on.
- Status LED is amber. BDE and ADE can communicate and are sitting idle. This light will turn green once the unit goes online.
- Signal LED is amber or green. The unit can "see" the satellite network. A red signal light indicates no signal.
- GPS LED is green. The unit has received the necessary GPS information required to operate.
- Data and Voice port lights are green. Provisioning details have successfully been received from the network and access to the service has been granted. If the unit has been denied access then the lights will be amber.

Accessing the Web

As long as your data port is provisioned and the proper physical connections made, access the Internet simply by starting your web browser. The IBSU allows you complete functionality to upload and download data, web pages, and email. Note: Large files or graphic intense web pages will take longer to transfer or display.

Note: Configuring the system and full diagnostics can only be done by the System Administrator and requires a login password. The default user name and password is "admin". Change the password if desired.

Important

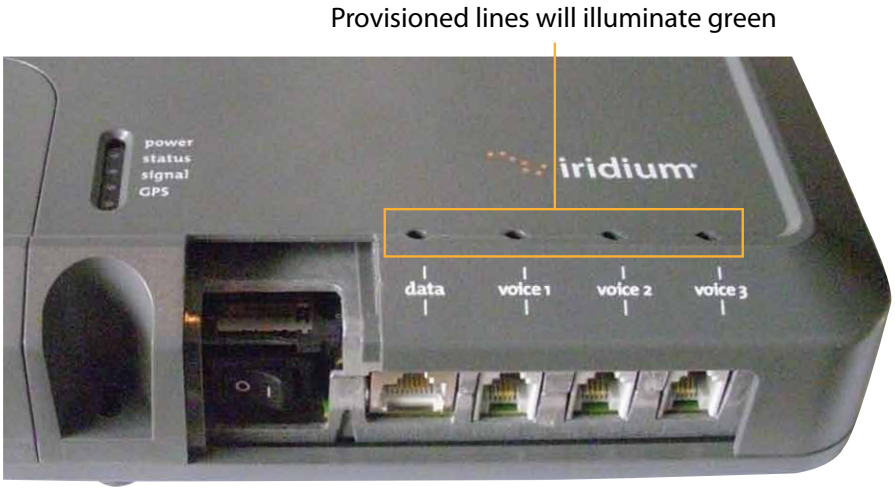
The Iridium Pilot unit supports "connect on demand" and will make a connection across the Iridium network if a data device tries to access an address outside the local area network. It is the user's responsibility to secure the system from outside access. Ensure proper security (e.g.: firewall, virus protection, encryption) is in place before using the system.

4.2 Telephony Operation

The BDE provides three connectors for POTS handsets, which can be used simultaneously. In order to make or receive a phone call you must have a valid SIM installed in the BDE.

Types of voice lines available are Standard or Crew. There are 3 voice lines available on the BDE and each can be provisioned with services. The BDE will indicate (illuminate green) the lines that have been provisioned.

Figure 4.0



Note: If none of the data or voice LEDs are green then it may be that no services have been provisioned. If they are amber, you may be denied access to the Iridium network. See Troubleshooting section for details on resolving this issue.

Voice calls can be placed using an Iridium provided handset or a standard "POTS" phone that is plugged into the BDE. Telephony calls on a standard line can be placed by dialing the country code followed by the number and a "#" symbol. Iridium Pilot does not require a "+" or "00" prior to entering the country code. Crew calls require the use of the pre-programmed buttons on the crew handset Iridium provides.

Normal Handset
& 2 m RJ-11 Cable

Standard Handset

The 3 handset interfaces are POTS interfaces, with RJ11 connectors. The Iridium Pilot unit's audio has been optimized to work with the handsets provided by Iridium.

Has to be connected to a line that has been provisioned as standard line.

Normal dialing (no "+" or "00" required)

Message waiting light

The Captain's handset can have a pin enabled in provisioning if the user desires.

Can receive MT calls.

Crew's Handset
& 2 m RJ-11 Cable

Crew's Handset

Iridium has a crew phone available with pre-programmed language buttons for use with scratch cards.

Has to be connected to a line that has been provisioned as 'crew' line.

Emergency calls are supported.

These handsets can ONLY make scratch card calls. There

are controls in the ISU to

block other call types.

MT calls not supported

Normal Dialing

(No '+' or '00' required)

Voice Call from Handset

A voice line can be configured to one of two line types, A crew line which must use an Iridium Pilot Crew handset, or a Standard line:

Follow these steps when calling from a Standard line:

1. Connect the handset to the BDE.
2. Type in the country code, the phone number required, ending with the # key.

For example:

country code + local phone number + #

Voice Call Using Iridium Prepaid Platform (Iridium GoChat™)

Iridium Pilot uses a dedicated phone for crew calling which requires an Iridium GoChat card (see your service provider for information on how to purchase an Iridium GoChat card). Placing a call requires pressing a dedicated speed-dial button, then entering the phone number followed by the #. At the prompt enter your scratch card pin number. Additional instructions are listed on each crew phone.

Follow these steps when calling using Iridium GoChat™:

1. Connect the handset to the BDE.
2. Press the dedicated speed-dial button.
3. Type in the country code, followed by the phone number, then the # key.
4. At the prompt enter your scratch card pin number.

For example:
country code + local phone number + #

PIN Feature

The PIN feature is only available for a "Standard" line.

- To disable PIN, dial *70*<PIN>#
- To enable PIN, dial *71*<PIN>#
- To change PIN, dial *72*<old PIN>*<new PIN>*<new PIN>#
- To change AND enable PIN, dial *73*<old PIN>*<new PIN>*<new PIN>#

If PIN is enabled, a user making call will need to enter PIN before other dialed digits; e.g.,

- <PIN><phone number>#

Regardless if PIN is enabled or not, PIN is NEVER required for emergency calls and supplementary service code (including PIN feature) dialing.

Call Barring (Blocking)

Call Barring is supported to block all incoming or all outgoing calls. A 4- digit password is used for all Call Barring operations –

Outgoing Call Barring

Note: There is only one password for Standard and Supplemental Service (default password: 0000).

- Activation: dial *33* <password> #
- Deactivation: dial *34* <password> #
- Check Status: dial *33# [A prompt will be played indicating if Outgoing call barring is enabled.]

Incoming Call Barring

- Activation: dial *35* <password> #
- Deactivation: dial *36* <password> #
- Check Status: dial *35# [A prompt will be played indicating if Incoming call barring is enabled.]

Call Forwarding

Iridium Pilot supports Call Forward Unconditional, Call Forward Busy, Call Forward No Answer, and Call Forward Not Reachable. The default number for call forwarding is the Voice Mail number of the phone line.

Call Forward Unconditional

Forward all incoming calls to another number. All calls will be forwarded to the registered number.

- Register: dial *21* <number> # [Specifies the phone number for Call Forward Unconditional.]
- Activation: dial *21#
- Deactivation: dial *22#
- Check Status: dial *23# [A voice prompt will be played indicating if Call Forward Unconditional is enabled and the number that is registered to forward calls.]

Call Forward Busy

Forward incoming calls if the phone line is currently in a call.

- Register: dial *67* <number> # [Specifies the phone number for Call Forward Busy.]
- Activation: dial *67#
- Deactivation: dial *68#
- Check Status: dial *69# [A voice prompt will be played indicating if Call Forward Busy is enabled and the number that is registered to forward calls.]

Call Forward No Answer

Forwards incoming calls if the phone line does not answer in a specified amount of time.

- Register: dial *61* <number>*<timeout> # [Specifies the number and timeout (in seconds) for Call Forward No Answer. If an incoming call is not answered by the unit in the time specified in the registration, the call is forwarded.]
- Activation: dial *61#
- Deactivation: dial *62#
- Check Status: dial *63# [A voice prompt will be played indicating if Call Forward No Answer is enabled and the number that is registered to forward calls.]

Call Forward Not Reachable

Forwards incoming calls after no response in reaching the Iridium Pilot unit (e.g., unit is turned off).

- Register: dial *24* <number> # [Specifies the number to forward to if there is no response in reaching the unit.]
- Activation: dial *25#
- Deactivation: dial *26#
- Check Status: dial *27# [A voice prompt will be played indicating if Call Forward Not Reachable is enabled and the number that is registered to forward calls.]

Call Forwarding Precedence

Call Forward Unconditional takes precedence, then Call Forward Busy, then Call Forward Not Reachable, then Call Forward No Answer. When a status check command is sent, only the highest priority active Call Forwarding is reported back.

Cancel all call forwarding – Cancels any and all types of call forwarding, including sending a call to Voice Mail.

- *002# - This command deactivates all call forwarding.

Voice Mail

If you have subscribed to Voice Mail then you will be notified that a Voice Mail is waiting for you in three possible ways:

- Interrupted "stuttering" dial tone whenever the user picks up the phone to make an outgoing call. Activation: dial *86#
- Message Waiting LED on the phone (if using the Iridium Standard Handset).
- On IBSU Status Page (see Section 7, System Administration)

One Voice Mail box is provisioned for each subscriber line provisioned as a Standard line. No Voice Mail box is provided for a Crew line.

To access your Voice Mail box a user can dial *86#. The user will be able to access the Voice Mail system to check and retrieve Voice Mail messages in the language settings of the subscriber line. On an Iridium Standard Handset the user can retrieve the Voice Mail by pressing the red Voice Mail Notification button at the bottom of the phone.

The Iridium Pilot Voice Mail System can also be reached by dialing 881663790000 from any phone line anywhere. When calling from other than a subscriber line the Voice Mail system will default to English and prompt for the subscriber line phone number to access the subscriber's Voice Mail.

4.3 Firmware Upgrades

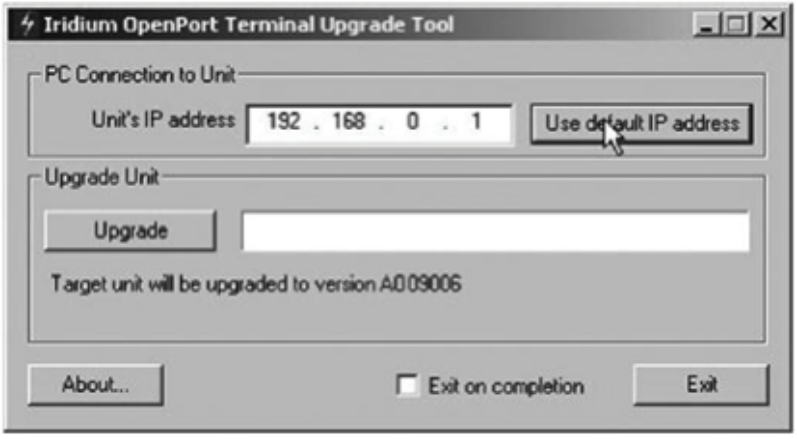
To upgrade the software you need:

- A Windows®-based PC
- Standard Ethernet cable
- Iridium Pilot Terminal Upgrade Tool executable software

Follow these steps to upgrade the software:

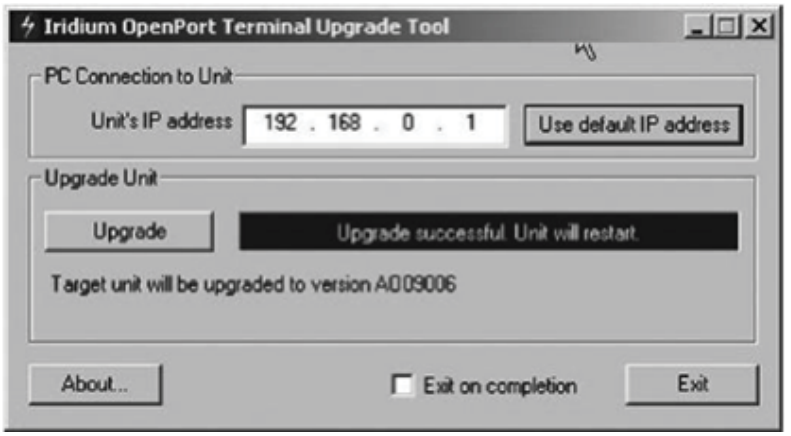
1. Connect PC to Iridium Pilot data port with a standard Ethernet cable.
2. Open a browser and verify connectivity with the Iridium Pilot unit by navigating to 192.168.0.1, which is the default IP address assigned to all Iridium Pilot units at the factory. If the default has been changed, enter the new IP address of the terminal.
3. If you see the Iridium Pilot status web page, proceed to step 4. Otherwise, you may need to configure TCP/IP properties in your computer – please refer to Section 4.12 for detailed instructions on computer setup.
4. Double click the Iridium Pilot Upgrade tool executable. The following window will appear. Enter the IP address of the Iridium Pilot unit.

Figure 4.2



5. Click the "Upgrade" button to start the upgrade process. The progress bar will move from 0 to 100 as the upgrade takes place. Once the upgrade process is complete, the message "Upgrade successful. Power cycle unit" will appear.

Figure 4.3



Microsoft product screenshot(s) reprinted with permission from Microsoft Corporation.

6. Turn the unit off for 30 seconds and then turn it on again.
7. To verify that the new software version was installed, connect to the Iridium Pilot Admin web page (see step 2), and click "diagnostics". The software version is displayed on this page.

Section V – TROUBLESHOOTING

5.0 Troubleshooting

Need to isolate problem to:

- ADE
- BDE
- Cable
- AC Power Supply
- Install Location (RF interference, physical obstruction)
- Configuration (of ISU, IP network or provisioning)

There are three main sources of information for troubleshooting:

1. The IBSU Status Web Pages (default address http://192.168.0.1)
2. BDE LEDs (also found on Status web page)
3. Site Survey Tool
4. Antenna Utility

5.1 LED Troubleshooting Charts

LED	Off	Green	Green Flashing	Amber	Red	Red Flashing
power	No power supplied to BDE	Power supplied to BDE and BDE switched on. Power is being passed to ADE.	Not Used	Power supplied to BDE, BDE switched off	Not Used	Not Used
status	Not Used	Idle: connected to the Iridium network but no traffic	Active: Voice or data is being transferred to/ from the Iridium network	Standby: not connected to the Iridium network.	Not Used	BDE cannot communicate with ADE – check connections.
signal	Not Used	Strong network signal detected	Not Used	Weak network signal detected	No network signal detected.	Not Used
GPS	Not Used	GPS signal available to ADE	Not Used	Not Used	No GPS signal	Not Used
data	Data port not provisioned.	Data port provisioned for use.	Flashing when data call in progress	Access to network denied - see Web Page for details.	SIM problem	Not Used
voice 1	Voice port 1 not provisioned. * Or handset off hook.	Voice port 1 provisioned for use.	Incoming call (ringing) or call in progress.	Access to network denied - see Web Page for details.	SIM problem	Not Used
voice 2	Voice port 3 not provisioned. *Or handset off hook.	Voice port 2 provisioned for use.	Incoming call (ringing) or call in progress.	Access to network denied - see Web Page for details.	SIM problem	Not Used
voice 3	Voice port 3 not provisioned. *Or handset off hook.	Voice port 3 provisioned for use.	Incoming call (ringing) or call in progress.	Access to network denied - see Web Page for details.	SIM problem	Not Used

*The BDE does not know what services are provisioned until it has connected to the network so this LED will be off at initial power up.

Suggested actions for the following fault conditions:

LED	Color	Reason	Suggested Action
power	Off	No power supplied to BDE	Get a qualified person to check the power being supplied to the BDE, it should be between 11 – 32VDC at the input to the BDE and capable of providing up to 50W.
power	Amber	Power supplied to BDE, BDE switched off	Remove the SIM cover and ensure that the on/off switch is in the on positions. With this switch in the on position the LED should be green. If the switch is on and this LED remains amber then call your service provider for assistance.
status	Red Flashing	BDE cannot communicate with ADE – check connections.	Get a qualified person to check the connection between the BDE and ADE, this should include the connections at the BDE and ADE and the entire cable between them.
signal	Red	No network signal detected.	It is valid for this LED to go red for short periods of time but it should not remain red. If it remains red it implies that there is a problem with the equipment. Please call your service provider and report all the information you can see on the web pages as well as the LED colors.
GPS	Red	No GPS signal	You may be in an area where a GPS signal cannot be received, if the vessel moves and the problem persists then contact your service provider and report that internal GPS has failed.
data	Amber	Access to network denied - see Web Page for details.	Access to the Iridium network has been denied, there are a number of reasons for this below for details (see Access Denied table, page 9.3).
data	Red	SIM problem	Check SIM inserted correctly and SIM lock on SIMholder pushed across. Check you have a valid Iridium Pilot SIM.
voice	Amber	Access to network denied - see Web Page for details.	Access to the Iridium network has been denied, there are a number of reasons for this below for details (see Access Denied table, page 9.3).
voice	Red	SIM problem	Check SIM inserted correctly and SIM lock on SIMholder pushed across. Check you have a valid Iridium Pilot SIM.

Power Diagnosis

Check power (multimeter may be useful)

- BDE power LED should be amber when BDE switched OFF but power supplied. If not check power supply input to BDE is between 100/240VAC into AC PSU which in turn should be providing 24VDC or between 11VDC and 32VDC if using DC supply.
- When BDE is switched on power LED should go green. If it doesn't then the internal power circuitry of the BDE is broken, replace BDE. *initial start-up LED will be amber which indicates power to the unit just not switched "on".

Note: If the power LED is amber it means some power is being provided to the BDE, but not necessarily enough. A voltmeter can be used to check this.

ADE/BDE Communications

A flashing red status light indicates the BDE is unable to communicate with the ADE.

1. Disconnect both ends of the ADE/BDE cable and test with an Ethernet cable tester.
- Will need to build an adapter cable to convert the ADE cable end to RJ45 for easier testing.

2. Inspect cable for damage. Frayed or spliced cables should be replaced.

3. Inspect ADE and BDE ports for damage.

4. Disconnect power and test input levels.

5. Replace in order- BDE, ADE, and cable; retesting setup after each component is swapped.

Signal Strength

Check signal strength LED or the signal strength indicator on the status web page.

Make a voice or data call from the Iridium Pilot unit to double check.

Observe the signal LED status over time. Does the LED change color frequently? Is there a pattern? Is the signal LED red for longer than 5 to 10 minutes?

It could be that the install location suffers from intense RF interference or physical obstructions within line of sight to the sky.

Site Survey Tool

- Site Survey Tool – This application puts the Iridium Pilot unit into a test mode and then proceeds to record the noise level on all possible channels.
- Needs to run on a Windows PC on the same subnet as the ISU (i.e. 192.168.0.xxx)
- Copy the exe and dll to a folder you create on the PC desktop, it will store the results in the same directory.
- Browse to directory and select SurveyTool.exe to run.
- The program needs to know the Iridium Pilot IP address, you will be able to select the default IP address or enter an alternative.
- Once the survey begins, graph data will begin to populate. There are 251 channels to test so it can take several minutes.

  Note: If you do not stop or allow the survey tool to complete, the Iridium Pilot unit will be left in test mode. You need to power cycle the unit to force it out of test mode.

- Once the test is stopped, click on File -> SaveAs to create a .csv file of the data. This output .csv file can then be analyzed and interpreted by Iridium.
- The survey will record the max and mean for the received signal strength indicator (RSSI) that it "hears." It will do this on each channel across all 7 antenna elements.
- Spikes in the resulting graph indicate channels unavailable to Iridium Pilot due to other sources transmitting on them. The more spikes, the more RF interference present.

Access Denied

Denial of access will be indicated by the voice and data LEDs on the BDE illuminating Amber. Access to the Iridium network may be denied for a number of reasons. The following items contain information that you may be asked to provide when contacting your service provider.

Reason	Suggested Action
TMSI invalid	Unit will automatically try to access the network using the IMSI.
IMSI invalid	Call service provider.
Authentication Failure	Check SIM status on Status web page, check using a valid SIM card. If all ok call service provider.
IMEI Blacklisted	Call service provider
Indeterminable Location	Check GPS LED on BDE. If LED is green, check GPS status on web page. Contact Service Provider with this information and denial information.
Restricted Area	Wait until move into different geographical area

Antenna Utility (Available in versions AO12001 and higher)

The Antenna utility allows you to effectively troubleshoot and identify antenna shadowing or interference problems.

The Antenna utility requires Admin login. You must login as Admin from the Diagnostics page of the IBSU GUI in order to see the Antenna array (see Figure 3.6).

Section VI – APPENDICES

Appendix A – Regulatory

FCC Declaration for 9701

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment Off and On, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications to this device not expressly approved by Iridium Satellite LLC may void authority granted under the rules of the Federal Communications Commission to operate this device.

Industry Canada

This product is compliant with Industry Canada RSS-102 for RF Exposure.

The 9701 BDE is a Class B digital apparatus and complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Declaration of Conformity

On behalf of Iridium Communication Incorporated, I declare under penalty of perjury that the following device complies with the requirements of the United States Federal Communication Commission pertaining to a personal computing peripheral device:

Identification: Iridium Broadband Terminal, Below Decks Equipment, Model 9701

Compliance Statement: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party: Iridium Communication Inc.
1750 Tysons Boulevard, Suite 1400
McLean, VA 22102
USA

Telephone 1.703.287.7400

Date: 02/09/11

Hermon Pon
Vice President, Technology
Iridium Communications Inc.

EU Declaration of Conformity

IRIDIUM

Declaration of Conformity
9801 OpenPort Terminal

Declaration of Conformity – EC Directive

This is to certify that the following equipment complies with all relevant Essential Health and Safety Requirements of the Radio and Telecommunications Terminal Equipment Directive 1999/5/EC and the Low Voltage Directive 73/23/EC as amended by 93/68/EC.

Equipment description	Iridium 9801 OpenPort Above Decks Equipment (ADE)
Serial numbers tested	900A0K, 900A0L, 900A0M, 900A0N, 900A0P
Manufacturer	Celestica, No 10&10A, 81200 Johor Bahru, Malaysia.
Issue date	15th August, 2008

The following harmonized standards were applied to the design of the handset:

Low Voltage Directive	**Test Report**	**Report Date**
EN 60950-1:2002	SU3664/8725	15th August 2008
R&TTE Directive - EMC	**Test Report**	**Report Date**
EN 301 489-20 V1.2.1 (2002-11) & EN 60945:2002	EU2780/8579	13th May 2008
R&TTE Directive - Radi	**Test Report**	**Report Date**
EN 301 441 V1.1.1 (2000-05)	RU1427/8509	2nd June 2008
	RU1496/8759	3rd Sept. 2008

The Test Report References above are test reports prepared by TRL Compliance Ltd, Moss View, Nip Lane, Up Holland, West Lancashire, WN89PY, UK.

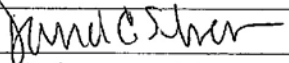
Accreditation references: TRL - UKAS 0728 and BSI FS 21805

The project master file, which contains or references all necessary documents to make up a "technical file is retained by Iridium satellite, LLC

The OpenPort 9801 Certification is dependent on the following criteria:

1. The OpenPort ADE is installed and used as described in OpenPort User Guide
2. The OpenPort ADE is only used with an OpenPort 9701 Below Decks Equipment (BDE)
3. The OpenPort ADE is manufactured by Celestica or an equivalent competent manufacturer adopting th same process with equivalent quality levels.

I am satisfied that relevant standards have been used in the design, the above documentation exists in the project Master File, and that the product will be labelled with the CE mark before despatch.

Signed		VP, Engineering
Date	September 16, 2008	

Appendix B – Specifications

RF Performance		
Frequency of Operation	TX	1616 to 1626.5 MHz
	RX	1616 to 1626.5 MHz
Channelization	FDMA spacing	41.67 KHz
	TDMA Timing	8.3 mS slot in a 90 mS window
	Channels available	64 channels
EIRP	1 ch (voice)	1.1 watts average power
	64 ch (max data rate)	2 watts average power
Modulation	Voice/Data	QPSK
Antenna	Type	6 dual element azimuthal array and 1 zenith element, electronically switched and phase steered
	Polarization	RHCP
	Gain	+8 dB
	Beam Width	Hemispheric coverage (60° per element)
	Steering	Automatic solid state
	Coverage	Horizon to horizon
	Ship's Motion	provides useful link margin up to roll = 20°

Power Requirements		
Main Power (AC)	Voltage	100 - 240 VAC
	Frequency	50/60 Hz
	Output Power	100 W (24 volts @ 4.2 Amps max)
DC input (power module)	DC Input Voltage	11 to 32 VDC
	Power In Standby	18 Watts
	Power During Call	22 Watts
	Power During Data	31 Watts

Environmental Specs		
ADE (Above Deck Equipment)	Enclosure Type	RF-transparent dome-shaped cover and metal base
	Temperature Range	-30 to +70 deg. Celsius
	Relative Humidity	0 to 93% RH
	Precipitation	meets IPx6 (high pressure water jets)
	Wind	in excess of 100 mph with proper mounting (see Installation Guide)
BDE (Below Deck Equipment)	Enclosure Type	IP33 compliant (use inside controlled environment)
	Temperature Range	0 to +50 deg. Celsius

Physical Description		
ADE	Diameter	57.0 cm
	Height	20.0 cm
	Weight	12.5 kg
	Mounting	M10 bolts arranged in a 15 cm diameter bolt circle
BDE	Length	25.0 cm
	Width	19.0 cm
	Height	5.5 cm
	Weight	1.35 kg
	Mounting	Indoor, flat, vertical wall (supports BDE weight)
Power Module	Length	14.0 cm
	Width	5.9 cm
	Height	3.5 cm
	Weight	< 0.5 lb
Interconnect Cable	Length (1)	45m
	Length (2)	70m (optional)

User Interfaces		
ADE	BDE Connector	Bulgin Buccaneer IP68 (9-pole fixed plug)
BDE	SIM Card	Furnished by Iridium Service Provider
	Data	10 baseT
	Voice 1	RJ-11 (2 wire) / POTS
	Voice 2	RJ-11 (2 wire) / POTS
	Voice 3	RJ-11 (2 wire) / POTS
	ADE Connector	RJ-45 (proprietary)

Appendix C – Limited Warranties, Conditions of Use and Limitations of Liability

Iridium Pilot™ Products
Terms and Conditions

All sales by Iridium of Iridium Pilot subscriber products (Above Deck Equipment, Below Deck Equipment, and Power Supply) (collectively the "Product") and accessories (i.e. cables, captain and crew handsets, mounts) ("Accessories") are subject to and conditioned upon the Purchaser's acceptance of these Terms and Conditions. Iridium objects to any additional or different terms contained in any documentation used or submitted by buyer unless expressly accepted in writing by Iridium. If any provision of these Terms and Conditions is found invalid under applicable law or court order, all other provisions shall be unaffected and remain independently binding and valid. The provisions in these Terms and Conditions supersede any contrary provisions in other Iridium documents, including *Iridium OpenPort Product Limited Warranty Policy*.

1. IRIDIUM PILOT LIMITED WARRANTY

Iridium warrants only that the Product, not including Accessories, shall be free from defects in materials and workmanship for a period of sixty (60) months (five (5) years) from the date of sale to the end-user. Iridium Pilot Accessories shall be covered by this Limited Warranty for twelve (12) months (one (1) year). Iridium does not authorize any person to assume or create for it any other obligation or liability in connection with any Product or Accessories.

IRIDIUM MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, SATISFACTORY QUALITY, NON-INTERFERENCE, ACCURACY OF INFORMATIONAL CONTENT, OR ARISING FROM A COURSE OF DEALING, LAW, USAGE, OR TRADE PRACTICE. IN NO EVENT SHALL IRIDIUM BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE PRODUCT OR ACCESSORIES, OR FOR ANY INDEMNIFICATION OF PURCHASER ON ACCOUNT OF ANY CLAIM ASSERTED AGAINST PURCHASER, OR FOR ANY OTHER DAMAGE OF ANY KIND, WHETHER DIRECTLY OR INDIRECTLY RELATED TO THE PRODUCT, ACCESSORIES OR IRIDIUM'S SERVICE. TO THE EXTENT THAT ANY IMPLIED WARRANTY CANNOT BE DISCLAIMED, SUCH WARRANTY SHALL BE LIMITED IN DURATION TO THE EXPRESS LIMITED WARRANTY PERIOD. THIS WARRANTY IS MADE BY IRIDIUM TO THE PURCHASER OF THE PRODUCT AND ACCESSORIES ONLY, AND IT IS NOT ASSIGNABLE OR TRANSFERABLE BY THE PURCHASER. TO THE EXTENT PERMITTED BY LAW, THIS IS IRIDIUM'S SOLE AND COMPLETE WARRANTY FOR THE PRODUCT AND ACCESSORIES. THIS WARRANTY COVERS PRODUCT AND ACCESSORIES ONLY. IRIDIUM MAKES NO WARRANTY AS TO COVERAGE, AVAILABILITY, OR GRADE OF SERVICE PROVIDED BY IRIDIUM SEPARATELY FOR IRIDIUM SATELLITE SERVICES. IRIDIUM ASSUMES NO OBLIGATION OR LIABILITY FOR ADDITIONS OR MODIFICATIONS TO THIS WARRANTY UNLESS MADE IN WRITING AND SIGNED BY AN OFFICER OF IRIDIUM.

This Product and Accessories is covered only by the LIMITED WARRANTY as stated above. To the extent permitted by applicable law, Iridium specifically disclaims any other warranty terms, liabilities, or obligations which may be implicated by sale or purchase of the Product or Accessories outside of the United States. Except as specified in this LIMITED WARRANTY, Products and Accessories are provided "AS IS."

If you acquired this Product and Accessories in Australia or in New Zealand, this Product and Accessories come with guarantees that cannot be excluded under the Australian Consumer Law or similar legislation in New Zealand. Notwithstanding other express terms and other limitations of this Limited Warranty (which other express terms and other limitations are negated by this paragraph, but only to the extent inconsistent with this paragraph, and will not be applied to limit consumer rights under such guarantees), where such guarantees operate, consumers are entitled to a replacement or a refund for a major failure of this Product and Accessories and for compensation for any other reasonably foreseeable loss or damage. Where such guarantees operate, consumers are also entitled to have this Product and Accessories repaired or replaced if this Product and Accessories fail to be of acceptable quality and the failure does not amount to a major failure. Please follow the instructions as to use and report problems promptly: problems caused by use that is abnormal or contrary

to instructions will generally not be covered. You should contact your Product and Accessories provider in relation to problems with the Product and Accessories and Iridium will assist your Product and Accessories provider to resolve them, including by replacement where required.

2. EXCLUSIONS

A. Product and Accessories Conditions Not Covered By The LIMITED WARRANTY in Section 1 above:

1. Product or Accessories damage caused by the use of equipment not furnished by Iridium, including accessories, power supplies and peripherals.
2. Failures caused by incompatibility of Iridium Product or Accessories used in a combination with equipment not furnished by Iridium.
3. Damage to any equipment not furnished by Iridium.
4. Defects or damage resulting from use of the Product or Accessories in any manner not in accordance with the User Manual or Installation Guide.
5. Damages resulting from accident or neglect, including but not limited to dropping the Product or Accessories on hard surfaces, submersion in water, improper testing, operation, maintenance, installation, adjustment, or any alteration or modification of any kind, including spliced or improperly terminated cables.
6. Scratches or other damage to surfaces or the appearance of externally exposed parts caused by Purchaser's use.

B. The LIMITED WARRANTY in Section 1 of these Terms and Conditions is VOID upon the following:

1. Product integration, installation, maintenance, or service in any manner other than in accordance with the Iridium installation and user documentation furnished with or applicable to the Product or Accessories.
2. Use of ancillary equipment not furnished by Iridium which damages Iridium Product or Accessories.
3. Product or Accessories disassembly, opening, or repair performed by anyone other than an Iridium Authorized Repair Center.
4. Removal, alteration, or obliteration of serial numbers or date tags.
5. Failure to comply with these Terms and Conditions, including Limitations and Conditions of Use in Section 4 below.

3. LIMITED WARRANTY CLAIMS – PURCHASER REMEDIES

At its sole discretion, Iridium shall, at no charge to Purchaser, either repair or replace the Product or Accessories, or refund the purchase price of a Product or Accessories that does not conform to this LIMITED WARRANTY, provided that the Product or Accessories is returned in accordance with the instructions set forth below and within the LIMITED WARRANTY period set forth in Section 1 above. Repair may include the replacement of parts and/or components with functionally equivalent, reconditioned, or new parts and/or components. Product or Accessories that is repaired or replaced in accordance with these Terms and Conditions will be covered by the LIMITED WARRANTY for the balance of the original warranty period, or six (6) months, whichever is longer. A returned Product or Accessories for which a replacement has been provided shall become Iridium's property.

To the extent permitted by applicable law, the remedies under these Terms and Conditions are Purchaser's sole and exclusive remedies. IN NO EVENT SHALL IRIDIUM, INCLUDING ITS LICENSORS AND/OR SUPPLIERS, BE LIABLE FOR ANY AMOUNT IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT OR ACCESSORIES, OR FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS, OR OTHER INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR RELATING TO THE USE OR INABILITY TO USE SUCH PRODUCT REGARDLESS OF NOTICE OF SUCH LOSS.

For warranty questions, repairs, service or for the return of Product or Accessories, contact the Iridium Service Provider or Point-of-Sale. Products and Accessories needing service should be returned to the Purchaser's Service Provider or Point-of-Sale. Purchaser's Service Provider will coordinate warranty service with Iridium to facilitate repair or replacement of the Product or Accessories. All Products and Accessories shipped to Iridium's authorized Global Warranty Center(s) must be shipped with freight and insurance prepaid. Products and Accessories returned to Iridium must be accompanied by a copy of the Return Material Authorization (RMA), and the RMA number referenced on the outside of the box.

Product and Accessories that is repaired or replaced under the LIMITED WARRANTY shall be returned to Purchaser at Iridium's expense for the freight and insurance, and at Purchaser's expense for any applicable duties or other charges.

4. LIMITATIONS AND CONDITIONS OF USE

In the United States, and subject to availability, emergency calls using 911 or 112 emergency systems, are routed to emergency call centers for response. OUTSIDE OF THE UNTIED STATES, EMERGENCY ACCESS NUMBERS SUCH AS 911, 112, AND/OR 999, ARE *UNAVAILABLE* ON THE IRIDIUM NETWORK AND MOBILE SATELLITE SERVICE. Iridium also does not currently support enhanced 911 or 112 services and does not provide information to emergency call centers to identify callers' locations.

Purchaser and all users of the Product and Accessories, including but not limited to the use of the Iridium phone services, in conjunction with 911, 112, or any other emergency or distress call services, both public and privately operated, acknowledge and agree as a condition of the provision of Iridium phone service that they will make no claim in contract, tort, or otherwise, against Iridium for any damages, bodily injury, loss of life, or any other loss arising from unavailability, delay, faultiness, or failures of the Iridium facilities, service, Product or Accessories, including inaccuracies with regard to any user information. Users disclaim any liability against Iridium arising from Iridium's service in exchange for the provision of Iridium's phone service through its Products and Accessories.

As part of providing its service, Iridium may disclose user information, including but not limited to name, address, telephone number and location information, including, where available, the geographic coordinates of equipment, to governmental and quasi-governmental agencies where Iridium deems it necessary in its sole discretion to respond to exigent circumstances or as required by law. Governmental and quasi-governmental agencies shall also be deemed "users" for all purposes of this provision and these Terms and Conditions.

Purchaser shall only use the Products and Accessories in connection with service on the Iridium satellite network using airtime purchased from Purchaser's Iridium Service Provider. Terms and conditions for use of the Iridium system and network airtime are provided separately by Purchaser's Service Provider. Iridium or Purchaser's Service Provider may from time to time change or establish additional terms and conditions. Iridium will attempt to reasonably provide Purchaser with notice of changes in terms and conditions. All terms and conditions will be effective as of the date such changes are made available publicly, and Purchaser's use of the Product or Accessories after such date shall constitute acceptance of new and/or modified terms and conditions.

The Product and Accessories must not be used in connection with any third-party devices, including but not limited to computers, cameras, batteries, GPS devices, recorders or other devices which alter the format of information sent or received by the Product or Accessories, except to the extent that Iridium has tested those devices and certified that their use will have no adverse effect on the Iridium satellite network. All devices approved by Iridium will be advertised and labeled as Certified by Iridium. Only such "Iridium-Approved Devices" may be used with the Product and Accessories and with the Iridium system.

Modification, reverse-engineering, or any attempt to reverse-engineer the Product or Accessories, any component of any Product or Accessories or the manner in which the Product or Accessories connects to, sends information to, receives information from, or otherwise interacts with the Iridium system is strictly prohibited, will void the LIMITED WARRANTY under Section 1 of these Terms and Conditions, and may result in legal action by Iridium.

5. INDEMNITY

Purchaser agrees to defend, indemnify and hold Iridium and its Service Provider harmless with respect to any claims or actions by any governmental entities or other third parties related to any violation of law with use of the Product or Accessories, misuse of the Product or Accessories under these Terms and Conditions, or any other violation of these Terms and Conditions and further agrees to pay all costs, damages, fines and other amounts incurred by Iridium, or on Iridium's behalf, in the defense of any such claims or actions. Airtime charges remain applicable for any and all misuse of the Product or Accessories.

Failure to comply with these Terms and Conditions, including Limitations and Conditions of Use, will void the LIMITED WARRANTY and Iridium reserves the right to terminate Iridium's service at any time.

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